THE

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Editorial.

THE BOARD OF AGRICULTURE REPORT.

THIS Report for the year 1903 has just been published, and contains much valuable and instructive matter. In addition to a great number of carefully compiled statistical tables referring not only to Great Britain and Ireland, but to foreign countries, the pamphlet is furnished with maps which show the incidence of swine plague and sheep scab in Great Britain for the three years 1901, 1902, and 1903. These maps present graphically by means of a simple scheme of colour the ravages made by the diseases, and the success of the efforts made to hold them in check. The effect thus simply produced by an appeal to the eye of the reader is very much more powerful than that produced by the solemn tables of statistics. We ought, of course, to be impressed by the figures, but somehow or other the maps, being pictures of a kind, are much easier to understand and even to remember. We are all merely children of a larger growth, and like to receive impressions of awe and wonderment. Who that gazes on the swine fever maps can fail to be duly terrified by the splash of glaring red—a veritable danger signal—which tells us that the West Riding of Yorkshire was afflicted in 1901 with 370 outbreaks. It is consoling to find that whilst in this map six shades of colour are required to indicate the intensity of the disease in 1901, the map for 1902 contents itself with four. In this year the West Riding vermilion is wonderfully tempered with strokes of white, and this, we find on reference to the colour index, means that only 181 outbreaks took place. It is interesting, again, to watch the colour passing over certain counties like cloud shadows on a summer day. Thus in 1901 Devon is coloured deep brown, showing outbreaks ranging from 51 to 100; in 1902 gleams of white intersect the brown, which means that the outbreaks now ranged from 26 to 50; in 1903 the brown has faded into buff, indicating that the outbreaks have sunk to something between 1 and 25. During the three years certain counties—for instance, Westmoreland and Perth—show complete immunity; others, like Forfar and Aberdeen, emerge from slight shadow into light, whilst over the whole country there is in 1903 a brightening of colour indicating a decline

of the disease. Yorkshire maintains its bad pre-eminence throughout, but Wiltshire progresses from 200 in 1901 to 25 in 1903, a most notable improvement in a bacon-producing county.

Sheep scab is almost confined to a broad track running north-east from the British Channel to the Tees, so far as serious outbreaks are concerned. Somerset emerges from darkness in 1903 and Kent in 1902, whilst Essex retrogresses. It is gratifying to note that the whole of Scotland, except Ross, fell in 1903 to 25 outbreaks and under, and that in the same year Norfolk and Suffolk were reported free of sheep scab.

Mr. Cope's report occupies some twelve pages of the pamphlet, and is admirably clear, succinct, and even graphic. It is satisfactory to learn that there is no cattle plague in Europe at the present moment, but we cannot quite share Mr. Cope's complacent conclusion that, as cattle are prohibited from landing from any part of Europe, the disease is not likely to be introduced. In a recent number of the JOURNAL we warned our readers against such assurance, and showed them that cattle plague might quite possibly be introduced by other means than cattle; the danger, as we pointed out, was all the greater and more subtle, because nearly all our veterinary surgeons are of necessity unacquainted with the symptoms and manifestations of the disease.

Foot-and-mouth disease is not such a deadly affair as cattle plague, but it can play frightful havoc. Mr. Cope tells us a startling story, which may serve to emphasise warnings which we have given from time to time of the danger of complacency. He reminds us that in the year 1880 we were beginning to congratulate ourselves that the animals of the country had either become immune or that the vitality of the virus had been exhausted, and the disease had died out. Unfortunately, at the end of the third quarter of 1880 several cargoes of cattle arrived at Deptford from France, nearly all of which were found to be affected with the disease in its most virulent and aggravated form. Now let us mark the consequences. Not long after the arrival of the French cattle a report was received from Charlton, in Kent, of the appearance of foot-and-mouth disease among some cattle in a gentleman's park. A few days later another outbreak was reported among a flock of sheep in Bedfordshire; then the disease appeared in the metropolitan market, whence it very soon extended to all parts of the country with such rapidity that within three months from the arrival of the French cattle it was reported from 38 counties in England. During that time there were 1449 outbreaks, and 32,320 animals were attacked. The rapid extension of the disease was easily accounted for by the fact that at the time when it was reintroduced there must have been thousands of animals of all classes which had never had the disease, and were therefore highly susceptible to the infection; further, the country having been free for some time, there were no restrictions on movement in force

when the disease was reintroduced. In the year 1881 it spread to 49 counties, and 183,046 animals were attacked!

We hope to return next month to this report, and meanwhile commend these eloquent facts to the attention of our readers.

Royal College of Veterinary Surgeons.

THE PRESIDENT (Professor W. O. Williams) presided over a Special Meeting of Council of the Royal College of Veterinary Surgeons, held at 10 Red Lion Square, London, on Friday, 22nd April 1904.

The following members were present:—Professors J. M'I. M'Call, M'Fadyean, Mettam, Penberthy, Shave; Messrs. Banham, Barrett, Bower, Dollar, Fraser, Lawson, Mason, M'Kinna, Mulvey, Shipley, Simpson, Trigger, Villar, Wragg; Mr. Thatcher (Solicitor), and Mr Hill (Secretary).

It was announced that Messrs. Byrne, Carter, Dewar, and Locke were unable to attend the meeting, and had sent letters of apology.

ALTERATION OF BYE-LAW LXXVI.

On the motion of Professor METTAM, seconded by Mr. LAWSON, the following alteration of bye-law passed by a Special Meeting of Council held on the 8th of April was confirmed:—

"76. Each candidate for the office of examiner shall, at least fourteen days before the date of election, intimate in writing to the secretary, either by himself, or, with his consent, by a member of the R.C.V.S., his desire to be appointed, *and submit with his application a statement of his qualifications and a copy of any testimonials he may possess as to his especial fitness for the position he seeks.*

"The name and qualifications of each candidate shall be suspended on the notice board at the College as and when received, and appear on the circular convening the meeting at which the examiners are to be appointed.

"Each examiner shall be elected for such period, not exceeding three years, as the Council may think fit.

"Each examiner shall be eligible for re-election. Any examiner shall be removed by the vote of two-thirds of the members present at any meeting of Council, to be confirmed by a special meeting called for the purpose."

Following the above meeting a Special Meeting of Council was held, at which the President occupied the chair, and Mr. Abson was present, together with the same members who attended the first meeting.

REPORT OF COMMITTEE *in re* AFFILIATION OF SCHOOLS.

The SECRETARY read the report of a meeting of the above committee held on April 13th, which stated that the Solicitor read a report on the constitution and power of the R.C.V.S. so far as they affected the teaching schools, and also the constitution of the schools themselves, which the committee adopted.

The following is the Report:—

"*Affiliation of Colleges.*

"In accordance with the instructions given me, I have perused the following documents with a view of reporting to the committee appointed for the purpose on the constitution and powers of this College so far as they affect the teaching schools, and also into the constitution of the schools themselves, namely:—The Act and Charters of the Royal College of Veterinary Surgeons, the Charters of the Royal Veterinary College, the Trust-Deed and Agreement of the Dick Veterinary College, the Letters-Mandatory of the New Veterinary College, Edinburgh, and the Charter of the Royal Veterinary College of Ireland.

"The Royal College of Veterinary Surgeons appears to derive such powers as it possesses, in the first instance, under the Charter of 1844, and (page 19 current Register) the persons who are entitled to become members of the Royal College of Veterinary Surgeons are defined as the persons then holding certain diplomas, and "such other persons respectively as now are and may hereafter become students of the Royal Veterinary College of London, or of the Veterinary College of Edinburgh, or such other Veterinary College, corporate or unincorporate, as now is or hereafter shall be established for the purposes of education in veterinary surgery, whether in London or elsewhere in the United Kingdom, and which we or our Royal successors shall under our or their sign-manual authorise in that behalf, and shall pass such examination as may be required by the orders, rules, and bye-laws which shall be framed and confirmed purusuant to these presents."

"It will be observed here that the Colleges to be authorised may be either corporate or unincorporate.

"The power of the College, so far as regards the students of such Colleges, is further defined (page 27 of the Register) as under:—

"And shall and may make orders, rules, and bye-laws for the regulation of the Council, and for the management of the estates, goods, effects, and property of the said body politic and corporate, and for fixing and determining the times and places of meeting of the Council, and also the times and places and manner of examining students who shall have been educated at the Royal Veterinary College of London, or the Veterinary College of Edinburgh, or such other veterinary colleges as hereinbefore mentioned, and who may be desirous to become members of the said body politic and corporate, and for regulating the nature and extent of such examinations, and for the appointment of persons to examine and determine upon the fitness and qualifications of such students, and for the admission or rejection of such students as members of the said body politic and corporate, and for fixing and determining the sum and sums of money to be paid by such students, either previous to their examinations or upon their admission as members of the said body politic and corporate, or otherwise and generally touching all other matters relating to and connected with the said body politic and corporate; and the same orders, rules, and bye-laws from time to time to alter, suspend, or repeal, and to make new orders, rules, and bye-laws in their stead as the Council shall think most proper and expedient, so as the same be not repugnant to these presents or the laws of this our realm."

"The Supplemental Charters follow on the same lines, and practically give no further rights so far as the teaching schools or their students are concerned.

"The bye-laws simply carry out in detail the directions of the Charter.

"The two Acts of Parliament do not, in my opinion, affect the question, except that, so far from giving the Royal College of Veterinary Surgeons any power over the schools, section 4 gives the students of the schools the right of examination in their own country.

"With regard to the teaching schools, it may be said generally that they are all of them independent bodies, and that the Royal College of Veterinary Surgeons has no power, so far as their own affairs are concerned, nor has it any right or power so far as regards the granting or withholding of a charter or other authority to any school now or hereafter to be in existence.

"Now, with regard to the schools themselves.

"The Royal Veterinary College, London, acts under two Charters, one dated 16th April 1875, and the other dated 1st June 1877. The practical effect of these two Charters, so far as constitution is concerned, is to make the Royal Veterinary College a corporation, with perpetual succession.

"The Dick College of Edinburgh is governed by a trust-disposition and settlement dated 16th February 1853 and 28th September 1864, and registered in the books of Council and Session of Edinburgh on the 12th April 1866. There is a supplemental agreement between Miss Mary Dick and the Town-Council of Edinburgh, dated 7th February 1867. These vest the property and control in the Lord Provost and Council of Edinburgh, so that the governing body is practically a corporation with perpetual succession. The right of their students for examination and admission is safeguarded by the Charter of the Royal College of Veterinary Surgeons of 1844.

"The New Veterinary College, Edinburgh, derives its right to send students for examination and admission by virtue of Letters-Mandatory dated 8th November 1873, directed to the President, Vice-President, Council, and Members of the Royal College of Veterinary Surgeons, and, after reciting briefly the clause above referred to in the Charter of 1844, it recites that a new College, called the New Veterinary College of Edinburgh, for the purposes of Education in Veterinary Surgery, has been established in Edinburgh under the charge of William Williams, a member of the said Royal College of Veterinary Surgeons, aided by an efficient staff of teachers. It then recites the request to place the College under the operation of the Charter of the Royal College of Veterinary Surgeons of 1884, and it then contains the following authorisation:—

"Now, know ye that we do hereby authorise the said New Veterinary College of Edinburgh, in terms of the provisions of the aforesaid Royal Charter, and we will and declare, that the persons who are now and may hereafter become students of the said New Veterinary College of Edinburgh, and shall pass the examination prescribed by our said Royal Charter, shall be Members of the Royal College of Veterinary Surgeons thereby incorporated, and shall be entitled to all the privileges given to such members by the said Charter."

"So far as I am aware, this is the only instrument under which the New Veterinary College of Edinburgh acts, and the question is, What rights have the College and its students? It is quite clear that while the College remains where it is, and until such letters are revoked, the students have the rights conferred by it. I consider, however, that this only applies so long as the teaching establishment remains in Edinburgh, and assuming it

to be removed to some other town altogether, then fresh Letters-Mandatory would, in my opinion, have to be obtained, or the present Letters endorsed with a permission to remove to such other town, but I do not think that the Royal College of Veterinary Surgeons has any voice in the matter, nor that any question from the Home Office on the subject is more than a request for information; it does not acknowledge any right on the part of the Royal College of Veterinary Surgeons. The question has been asked, In whom is the right to carry on the College vested, but the Royal College of Surgeons is not interested in that question, as the right conveyed by the Letters is the right to the students, and not any to the Principal or other proprietary body. A question has also been asked, what it is constitutes the College, and whether, assuming a monopoly is created, whether such monopoly is transmissible. As I have before said, I do not think this question concerns the Royal College of Veterinary Surgeons; but, for the purpose of forming an opinion, it seems to me that several points must be considered. In the first place, what is the meaning of the recital in the Letters that the College has been established. It must be remembered that the rules of construction of any Act under the King's sign-manual are different to the rules of construction as applied to other documents; the recital here amounts to a statement; and the question is, whether the statement that a College has been founded is an acceptance of the fact, and of itself would create a college or corporation sole. I hardly think the words would carry so extensive an operation as to create a corporation sole. This, however, is immaterial, as the Charter covers Colleges, whether corporate or unincorporate. The question of the ownership of the New Veterinary College is one which, as before stated, does not affect this College. I am inclined to think that an establishment of this sort, with its privileges, is transmissible, and that the remedy, in case of its getting under improper management, would be for any member of the public to apply for a revocation of the Letters-Mandatory. I must say, however, that I give this view with considerable hesitation, and if it is thought that a definite opinion should be obtained, then I would suggest that a case should be laid before counsel.

"I have not received any instrument relating to the Glasgow Veterinary College.

"The Royal Veterinary College of Ireland was established by Charter in 1895, and, briefly, the observations with regard to the Royal Veterinary College, England, may be taken to apply to this College also. The right of their students to examination and admission to the Royal College of Veterinary Surgeons is expressly provided for, as is also the affiliation to the said Royal College of Veterinary Surgeons, in like manner as the then present English and Scottish Schools, but with the same right of independent action and responsibility so far as regards its own internal actions and affairs. (Page 9 of Charter.)—Yours very truly," "GEO. THATCHER."

The Committee appended to the above Report the following addition:—"That in the case of the Royal Veterinary Colleges of London and Ireland, and the Dick College of Edinburgh, provision for perpetual succession of the governing body is secured. In the two affiliated Colleges, so far as can be ascertained, there is not in existence any document creating this succession, unless the Letters-Mandatory involve that. As partly bearing on that point, however, in the case of these two Colleges it appears to the Committee and the Solicitor that the Principal is the governing body.

Furthermore, that in the only instance in which a vacancy has occurred in the governing body or Principalship, such Principalship has, without question, been transmitted by legal process."

On the motion of Professor M'FADYEAN, seconded by Mr. MULVEY, the Report was received and adopted.

The PRESIDENT stated that the Solicitor asked the Committee whether he should obtain counsel's opinion, and the Committee agreed that it was unnecessary to do so.

The Report was then adopted.

CONSIDERATION OF LETTER FROM THE HOME OFFICE IN REGARD TO THE REMOVAL OF THE NEW VETERINARY COLLEGE FROM EDINBURGH TO LIVERPOOL.

The Council proceeded to consider the letter from the Home Office which was read at the previous meeting of Council, the consideration of which was deferred to the Special Meeting.

In reply to a question by Mr. Dollar, the Secretary stated that there had been no additional correspondence.

Mr. BARRETT asked, for the convenience of those who were not present on the last occasion, that the President should give the purport of the correspondence.

The PRESIDENT stated that he wrote as Principal of the New Veterinary College to the Home Secretary asking permission to remove that College from Edinburgh to Liverpool, and gave the reasons why he so desired. The Home Secretary replied that he saw no objection according to the letter, and asked for the observations of the Council of the R.C.V.S.

Mr. DOLLAR said he wished to ask two questions. As he understood it, the Solicitor said that the right was a right to the students and not to the persons directing the College. He wished to ask whether the Letters-Mandatory were not specially directed to the students of the New Veterinary College, and not to the students of a College in any other city. The second question was that, so far as he could learn, the Solicitor thought that the rights of proprietorship were transmissible; he took it that meant they could be transmitted from father to son, or from Principal to Principal, but it did not mean that the school could be transmitted from one city to another.

Mr. THATCHER (Solicitor), in answer to the first question, said the Letters-Mandatory were addressed to the College, and simply amounted to the statement that the students educated at the New Veterinary College were to have the privileges of being examined at the R.C.V.S. and being admitted the same as students of other Colleges.

Mr. DOLLAR inquired if that meant that the Letters-Mandatory referred only to students at the New Veterinary College, Edinburgh, and not at any other place.

Mr. THATCHER replied in the affirmative. With regard to the question of transmissibility, the word was in respect of the right of property—*i.e.*, taking the College as an instance, the right of property in the College as a going concern was, in his opinion, transmissible by descent or purchase, but it did not mean that the College could be moved from one place to another; but he repeated what he stated in his opinion, that on the question of transmission he spoke with a certain amount of hesitation.

In reply to a question by Mr. Barrett, the Solicitor stated that the

Letters-Mandatory were under the sign-manual of the Crown, and that it was entirely a question of the prerogative of the Crown.

Mr. MULVEY asked if there had been any further correspondence from Liverpool with reference to the matter.

The PRESIDENT stated that the following telegram was received a few moments ago :—

"To the President, R.C.V.S.—At request Chairman Animal and Meat Trade Section, Liverpool Chamber of Commerce, I beg to transmit following resolution passed unanimously by section on 15th instant :—'Resolved that the Animal and Meat Trade Section of the Liverpool Chamber of Commerce strongly approve and welcome the establishment of a School of Veterinary Science in connection with the University of Liverpool, as being likely to be of great advantage to their trade.' Secretary, Chamber of Commerce."

Mr. MULVEY inquired if that was the only communication on the subject.

The PRESIDENT replied in the negative, and the Secretary then read the following letter :—

"LIVERPOOL, *20th April* 1904.

"TO THE COUNCIL OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

"GENTLEMEN,—It has only recently come to our knowledge that the Council has been asked to express its approval or disapproval of a proposal to establish a Veterinary College in Liverpool, and to affiliate it to the Royal College of Veterinary Surgeons. As this appears to us to be a proposal which threatens our interests as members of the profession engaged in private practice in this city, we desire to appeal to the members of the Council for the protection which they alone can afford us.

"The movement for the establishment of a Veterinary College here has been conducted in such a way as to leave us without any precise information as to the constitution of the school which it is proposed to found, but we understand that those who are responsible for the movement do not contemplate placing any restriction on the rights of the members of the staff to engage in private practice. That is the respect in which we consider the proposal opposed to our interests as private practitioners. We believe these interests to be equally threatened whether the proposal is to transfer the members of the staff of the New Edinburgh College to Liverpool, or to make up a staff for the Liverpool College by engaging the services of some of those members of the profession who are now conducting private practices here. It will, we think, be obvious to the Council that to attach certain private practitioners to the College as professors or lecturers would tend to give them in the public eye an importance which they otherwise would not have, and thus to confer on them an unfair advantage over the other private practitioners in the city and neighbourhood.

"We do not desire to express any opinion as to the necessity or advisability of establishing a Veterinary College in this part of the kingdom, but we do venture to express the view that if such a College is to be founded, its dignity ought to be preserved by insisting that the members of its staff shall not have to engage in private practice in order to supplement the salaries paid to them.

"We most respectfully but earnestly request that the Council will take these representations into their careful consideration, and that they will endeavour to avert the dangers against which we shall otherwise be

powerless.—We beg to subscribe ourselves, Gentlemen, your obedient servants,

" G. BERRY, Liverpool.
" L. BUTTERS (as approval of the Memorial, although not in active practice), Liverpool.
" GEO. M. DANEY, Liverpool.
" BENJAMIN DUFF, Liverpool.
" JOHN ELLIS, Liverpool.
" G. L. HARBER, Liverpool.
" THOMAS KYFFIN, Liverpool.
" W. L. LOCKBURN, Liverpool.
" JAMES M'LAREN, Liverpool.
" ALFRED W. MIDDLEHURST, Liverpool.
" JONATHAN PARK, Woolton.
" J. CHAS. REYNOLDS (as approval of the Memorial, although not in active practice), Liverpool.
" HAROLD G. ROGERS, Liverpool.
" THOMAS SIMPSON, 70 Seel Street, Liverpool.
" A. WALKER, Liverpool.
" JOSEPH WELSBY, West Derby, Liverpool.
" JAMES H. WHITE, Liverpool."

The SECRETARY also read the following letter:—

"At a meeting of the veterinary surgeons in and around Liverpool the following was unanimously resolved:—'Having heard the full facts of the veterinary movement and intention of the Liverpool University, we, the undersigned members of the veterinary profession practising in Liverpool and surrounding districts, welcome the establishment of a veterinary school in connection with the University.' Proposed by Mr. Elam, seconded by Mr. A. Richardson, and passed unanimously.

" F. A. BALL, Ormskirk.
" W. BERRY, Vauxhall Road.
" A. S. BROOKSBRANK.
" THOMAS DOBIE, Warwick Fowle, Birkenhead.
" T. DUGGLE.
" CHARLES W. ELAM.
" G. L. HARBER, Walton Road.
" STRAFFORD JACKSON.
" T. EATON JONES.
" JOHN MACGUIRE.
" A. W. MIDDLEHURST.
" R. E. MONTGOMERY.
" JOHN PARK, Woolton.
" ARNOLD RICHARDSON.
" R. ROBERTS, Seaforth.
" HAROLD ROGERS, Bootle.
" T. SHEPHERD, Liverpool.
" HENRY SUMNER, Hatton Garden.
" JAMES SUMNER.
" JAMES WHITE.

"It was proposed by Mr. Richardson, and carried unanimously, that the resolution be forwarded to the Council meeting of the Royal College of Veterinary Surgeons."

The PRESIDENT explained that the first document read was carried from establishment to establishment in Liverpool asking for signatures. A formal meeting of the veterinary surgeons was called in Liverpool, which met the previous evening, and seven of those who signed the original document withdrew their support from it and signed the second.

Professor M'FADYEAN inquired if any of those who had signed the second document were to be connected with the New Veterinary College in Liverpool, and if so how many there were.

The PRESIDENT replied that they would be connected with the Infirmary, not with the University.

Mr. BARRETT inquired if any scheme had been prepared with regard to the education of the students, and generally what arrangements had been made.

The PRESIDENT thought that information had been conveyed at the last meeting.

Professor M'FADYEAN supported Mr. Barrett's request for information. It appeared to him of the utmost importance that the Council should know in whom the management of the new institution was to be vested, and what was the constitution of the governing body.

After a further short discussion, in which Mr. Barrett and Professor M'Fadyean again pressed for further information, the PRESIDENT stated that it was proposed that Professor Williams, of the New Veterinary College, Edinburgh, should be the Principal or Dean of the school, a similar position to that held by Professor M'Fadyean at Camden Town.

Professor M'FADYEAN said they were not so much interested in knowing who were to compose the staff, but were more interested in knowing the constitution of the Liverpool Veterinary College. In the event of the President disagreeing with whoever were the powers in Liverpool the day after he went there, somebody would possess the privileges which went along with affiliation. Who would they be, who were the governing body, or was that still in a nebulous state?

The PRESIDENT replied that that was still in a nebulous state. At present he was the Principal of the New Veterinary College, and as such was transporting his rights and privileges from Edinburgh to Liverpool. In all probability within a very short time he would have associated with him people who would have a certain amount of the power which he possessed solely at the present time.

Professor M'FADYEAN inquired who they were.

The PRESIDENT said he could not say, because he did not know himself.

Mr. MASON inquired what governing body the President would be under.

The PRESIDENT said he was going to be there as Principal and Dean of the School.

Mr. ABSON asked who would receive the fees of the students.

The PRESIDENT replied that the fees would be paid to the Liverpool University, and the salaries would be paid by the Liverpool University.

Mr. BANHAM presumed that it might be taken that the University of Liverpool would be the governing body.

The PRESIDENT replied that probably they would ultimately.

Mr. BANHAM inquired if there was any evidence that they would be the governing body.

The PRESIDENT replied in the negative.

Mr. BANHAM thought the Council ought to have some.

Professor M'FADYEAN asked how many votes veterinary members would have on the governing body of the Liverpool University.

The PRESIDENT said there would be, as in all universities, a Faculty, and there would be four or five at least out of the Veterinary Faculty.

Mr. BARRETT said it was clear to his mind, having regard to what Mr. Thatcher said in his Report, that the Council had very little power in regard to the matter, and that the utmost they could do was to reply as a matter of courtesy to the letter which had been addressed to them by the Home Secretary. He quite appreciated the difficulty Professor Williams found himself in. It was all very well for members to ask him numerous questions as to the constitution of the governing body and as to the number of gentlemen who were to be employed to teach veterinary subjects; but it was clear from what the President had said that the scheme had not been fully propounded and decided upon, and therefore they had to rely to a very great extent upon the well-known character of Professor Williams to consider the subject carefully before he advocated such a change as he desired. He thought the Council ought to further the scheme in every possible way, and an opportunity now offered when the veterinary art might be affiliated with a University, which most of the advanced members of the profession were in favour of. He represented the profession as a whole, and was not present to further the interests of any particular school or body of practitioners; and unless it could be shown to him that veterinary students would not have additional facilities for education he should favour the scheme. He moved, "That the Council of the Royal College of Veterinary Surgeons welcomes the proposed movement of the New Veterinary College to Liverpool, and its attachment to the University there as a tangible indication of the recognition of the mutual advantages to be derived from a closer binding together of the two great sister professions of human and veterinary medicine."

Professor M'CALL seconded the motion.

Mr. BANHAM thought that before any of the members could approve of the scheme they ought to know what it was. He appreciated the Liverpool University's offer, provided it was a sufficient offer, and that it would advance the profession in any way.

The PRESIDENT said he hoped it was thoroughly understood that the Liverpool University, without being asked, had stated that they admired the veterinary profession's one portal system of entrance into the profession, and that they would still continue to uphold it, and would have nothing to do with the granting of licences entitling men to practise as veterinary surgeons. The reason they stated that emphatically was because an attempt was made by Edinburgh University to pass an Ordinance in which no notice whatever was taken of the Royal College of Veterinary Surgeons; and had it not been for the action of the Solicitor that Ordinance would probably have passed, and in all probability Edinburgh University would have started veterinary teaching, with a veterinary licence and a veterinary degree, quite independent of the licence granted by the Royal College of Veterinary Surgeons, and there would then have been a dual qualification for veterinary surgeons.

Mr. MULVEY thought that no rival body could be instituted unless they obtained a fresh Act of Parliament overriding that possessed by the College. He had heard no sufficient arguments adduced which tended in any way to alter the opinion that he had formed, that the profession already had

too many Colleges, and he moved as an amendment the resolution which he brought forward at the last meeting, namely,—"That in the interests of veterinary education the Council of the Royal College of Veterinary Surgeons would welcome any arrangement which would reduce the present unnecessary number of the affiliated Colleges in Scotland, but for the same reason they feel compelled to express disapproval of the proposal to establish a second Veterinary College in England, and to have it affiliated to the Royal College of Veterinary Surgeons."

Mr. WRAGG seconded the amendment.

Mr. M'KINNA hailed with pleasure the approaches that universities were making towards the veterinary profession, and if their interests were quite safeguarded by a university, he should without hesitation vote for the scheme purely in the interests of the students, but there was nothing official from a university before them.

The PRESIDENT said it was absolutely impossible for him to lay down an exact scheme of what was going to be done; he had done his best to give the Council everything that was absolutely settled, but the following was a statement:—"An opportunity is now offered by a university placing its laboratories at the service of a veterinary school, &c." [reads quotation.] All the laboratories connected with the Liverpool University were offered for the education of veterinary students. Furthermore, subjects which were common both to medical students and veterinary students would be taught by the University professors. Elementary Botany would be taught by Professor Harvey Gibson, Elementary Zoology by Professor Herdman, Chemistry by Professor Campbell Brown, Physics by Professor Wilberforce, General Pathology by Professor Boyce.

Mr. ABSON asked how many veterinary surgeons there would be on the teaching staff.

The PRESIDENT stated that at the present moment Mr. Eaton Jones, the Veterinary Surgeon to the Corporation of Liverpool, and another gentleman were the only two appointed. One was to be appointed for the teaching of Veterinary Anatomy, and there would be others appointed in connection with the infirmary.

Professor PENBERTHY asked who appointed Mr. Eaton Jones.

The PRESIDENT stated that his name had been suggested to him, and he adopted him.

Professor SHAVE inquired if the Council was to understand that the Senate of the University appointed Professor Williams as Principal.

The PRESIDENT said they had not.

Professor M'FADYEAN said the fact was it was not correct to say that the Liverpool University had made any application for the recognition of a Veterinary College affiliated to them. It struck him that the attitude of the Senate of the Liverpool University was something like this: these veterinary surgeons are not at present fit to be touched by us directly, but we will try to get at them through the agency of the Liverpool Institute of Comparative Pathology. He had no doubt that if he were to ask Professor Williams what was the constitution of that body, he would again plead ignorance.

The PRESIDENT said it was a committee.

Professor M'FADYEAN asked if it was a committee capable of paying dividends.

The PRESIDENT said not that he knew of.

Professor M'FADYEAN said its main business was the manufacture and sale of serum.

The PRESIDENT replied that none of the profit derived from the sale of serum was devoted to anything but research work.

Professor M'FADYEAN thought the Council had better not be deceived; it was not the Liverpool University that was going to be incorporated, but the Liverpool Institute of Comparative Theology.

Mr. BANHAM said that that was the Liverpool University.

Professor M'FADYEAN said it was not.

The PRESIDENT said he stated quite distinctly that Liverpool University had invited him to go there.

Professor M'FADYEAN said the fact was that there were in Liverpool a set of medical gentlemen who masqueraded somewhat after the fashion of a stage army; they went out of one door as the Medical Faculty of the Liverpool University, and came in at another as the Liverpool Institute of Comparative Medicine. The President at any rate had not contradicted his statement that there was not at present any proposal to start a Veterinary College in Liverpool and make it an integral part of Liverpool University.

The PRESIDENT said he hoped it would be before long.

Professor M'FADYEAN said it might be, but he hoped not.

The PRESIDENT said it would not be if Professor M'Fadyean could help it.

Professor M'FADYEAN said he wished to deal with the question of no jurisdiction, which was started first by Mr James Simpson, who wanted to persuade the Council that the letter from the Home Secretary only demanded a courteous sort of colourless reply. He was perfectly emphatic in his belief that that was the wrong view. It was an outrage on common sense to try and persuade the Council that the Home Secretary, in addressing his letter to the College, did not expect them to state clearly and fully whether they approved of the proposed College or not, and naturally the Home Secretary would suppose that their reply would be framed solely after consideration as to whether the proposal would be for the general interests of the profession or not. He was fairly well satisfied that if the Council said it approved of the scheme it would go through, but if it said it disapproved of it, it was highly probable the scheme would not go on. He could not imagine that the Crown would affiliate a school under a corporate body provided the corporate body did not approve. With regard to the two petitions from the Liverpool practitioners, Mr Barrett had said that he would sink the interests of the few in the many. If Mr Barrett had been standing for Council next election, he would have challenged him to ask the brother members of his profession if they approved of his sacrificing the interests of the practitioners in Liverpool to what he regarded as the interests of the practitioners all over the country.

Mr BARRETT said he should not mind if they approved or not; he should take the same course.

Professor M'FADYEAN ventured to say that Mr Barrett would lose his seat.

Mr BARRETT replied that he would not mind; he should give an honest opinion.

Professor M'FADYEAN thought the one petition did not in the least neutralise the other. If half a dozen men practising in Liverpool had been foolish enough to say that they did not care whether a Veterinary School was started in their midst to appropriate a portion of their practice, that did not in the least relieve them from the duty of protecting those who claimed that their interests were going to be threatened and encroached upon. A great deal had been said about the ennobling influence the

Liverpool University was going to have on the veterinary profession through the few students it was going to teach. He held in his hand a portion of the copious literature that was being put forth, not he thought by Professor Williams, but some of the learned medical gentlemen.

Professor WILLIAMS said he was responsible for a portion of it.

Professor M'FADYEAN said he thought he should compel Professor Williams to say that he would have been ashamed to put his signature to what he was going to read, namely, a part which said, among other things representing the immense advantages that were to flow from the institution of the New College in Liverpool, that the veterinary students would be allowed to associate with medical and science students on an equal footing. Did the President have any part in that?

The PRESIDENT replied certainly not; that was a newspaper report probably.

Professor M'FADYEAN said that that was probably Professor Boyce.

The PRESIDENT replied not that he knew of.

Mr. BARRETT asked for the authority.

Professor M'FADYEAN said he had seen it at least half a dozen times. Speaking for his own students, he most strongly resented the insinuation that they were in any way inferior to the students found at Liverpool. A further point had been made that the Council could not regard the application as an application by itself. If they expressed approval of the starting of Veterinary Colleges as appendages to the Medical Schools and Universities, it was quite certain they would have quite a considerable number of applications of the same sort. Mr. M'Kinna was one of those who thought that the more they had the better, provided they were well equipped, but where were they going to get the clinical material which was not already appropriated? There was no room to start a new Veterinary College in any city without appropriating the practices of the private veterinary surgeons, and that was a point upon which the persons behind the movement were absolutely misleading the public. They had had the audacity to say there were absolutely unrivalled opportunities for teaching veterinary students in Liverpool, and that many million pounds worth of cattle were imported at Birkenhead, and what an immense advantage it would be to have those animals inspected by veterinary students. Mr. Cope, if he was appealed to, would say that that was absolutely misleading the public. The animals were not available for clinical teaching at all. Putting that aside, there remained no other material in Liverpool to be used for the practical teaching of veterinary students except what belonged to private practitioners there. The members could quite foresee that when the amendment and motion had been disposed of, Mr. Simpson was lying in wait with another amendment advising them to report to the Home Secretary that they had not enough information before them. He thought that would be very unwise. In his opinion the best answer that could be made to the Home Secretary was that the Secretary be instructed to say that his letter was laid before the Council, which passed the resolution and desired it to be forwarded to him. He therefore supported Mr. Mulvey's motion.

Mr. SIMPSON said he thought Professor M'Fadyean hardly meant to be unkind, but what the Professor said was certainly not correct. He (Mr. Simpson) said that he did not intend to vote one way or the other until he thoroughly understood the scheme, neither would he. He had no axe to grind in the matter, and until he understood the scheme he would not

hold up his hand in favour of it or against it. The present meeting showed the necessity of a further consideration of the subject. Gradually and gradually they were getting acquainted with it, and knowing what there was to be said against it, and what little there was perhaps at present to be said in its favour, he asked that he should be given credit for being honest, as he ventured to say Professor M'Fadyean claimed to be honest.

After further discussion, during which Mr. M'Kinna stated that it seemed to him that it was not a University which had offered its services, and he therefore could not support the scheme on that ground. Mr. Villar and Mr. Trigger both spoke in support of Mr. Mulvey's amendment.

Professor M'CALL took exception to the interpretation which had been put upon the term that veterinary students would be allowed to associate with medical students. It was not a question of social position at all; it meant that, being students, they would be allowed to have the identical advantages which medical students had in the teaching of certain subjects. The suggestion which had been brought forward that it inferred that the veterinary student was a person inferior to the medical student was never mooted at all.

Mr. MULVEY'S amendment was then put and carried, sixteen voting for and three against.

The amendment was then put as the substantive motion and carried, sixteen voting for and three against.

Professor M'FADYEAN did not think it would be sufficient to merely have the resolution sent to the Home Secretary, but thought it would be desirable to appoint a committee to watch over the interests of the Council, which should express their readiness, if desired, to wait on the Home Secretary and explain to him at length the reasons that had guided the Council in arriving at the resolution. He therefore moved that a committee composed of Messrs. Mulvey, Wragg, and Dollar be appointed with that object.

The PRESIDENT said he strongly objected to three members from London being sent to the Home Secretary.

Professor M'FADYEAN said he would add Mr. Mason's name.

Mr. TRIGGER thought it was rather an unusual proceeding.

Mr. MULVEY seconded the proposition, at the same time urging that Professor M'Fadyean should serve on the committee.

Mr. BARRETT disagreed with the proposition, and could not understand why the Council should be so anxious to rush a deputation before the Home Secretary when he had not asked for it, and as the Council had vetoed the scheme he could not see the necessity for the deputation. He suggested that the question of a deputation to the Home Secretary might be deferred to the next meeting; in the meantime the members would have the opportunity of considering the question thoroughly. If, however, a committee was appointed, he suggested that at any rate one member of the minority should be appointed.

After further discussion, during which the chair was vacated by the President and taken by Mr. Simpson, Professor M'Fadyean's motion, "That a committee be appointed to watch over the movement for the establishment of a Veterinary College, and to offer to wait on the Home Secretary to explain at length to him the reasons that guided the Council to the resolution just passed, the committee to consist of Messrs. Mulvey, Wragg, Dollar, and Mason," was put and carried.

The Council then adjourned.

CLOSE OF EDINBURGH NEW VETERINARY COLLEGE.

PRIZE LIST, 1903-4.

THE annual and last presentation of prizes in connection with the New Veterinary College, Edinburgh, took place on Monday, 16th ult., in the College buildings. Principal Williams occupied the chair, and presented the medals as follows :—

AN OLD STUDENT'S £25 PRIZE—Mr. H. E. Cross, M.R.C.V.S.

VETERINARY MEDICINE—
Highland and Agricultural Society's Silver Medal—Mr. H. A. Turner.
1st Class Certificates—Messrs. H. A. Turner, R. Mairs, H. E. Cross, S. H. Gaiger.

VETERINARY SURGERY—
Highland and Agricultural Society's Silver Medal—Mr. R. Mairs.
1st Class Certificates—Messrs. R. Mairs, H. E. Cross, J. A. Fearnside, S. H. Gaiger, K. P. Rankin, J. B. Chadwick.

MEAT INSPECTION—
Highland and Agricultural Society's Silver Medal—Mr. R. Mairs.
1st Class Certificates—Messrs. R. Mairs, H. E. Cross, J. B. Chadwick, J. Aitken, P. Reilly. E. W. Nickson, J. A. Fearnside, H. A. Turner, K. P. Rankin, S. H. Gaiger, S. Robson.

MATERIA MEDICA—
Highland and Agricultural Society's Silver Medal—Mr. R. H. Allinson.
1st Class Certificates—Messrs. R. C. Allinson, J. Sheffield, R. F. Bett.

GENERAL PATHOLOGY—
Highland and Agricultural Society's Silver Medal—Mr. R. F. Bett.
1st Class Certificates—Messrs. R. F. Bett, J. Sheffield, R. C. Allinson, G. H. Petch.

ANATOMY—
Highland and Agricultural Society's Silver Medal — Mr. Percy Thexton.
1st Class Certificates—Messrs. Percy Thexton, J. G. Runciman, John Taylor, E. Greenway, F. Macdonald, John Smith.

PHYSIOLOGY—
Highland and Agricultural Society's Silver Medal—Mr. John Smith.
1st Class Certificates—Messrs. John Smith, J. G. Runciman, Percy Thexton, E. Greenway, John Taylor, G. Gordon, O. Carlyle, J. H. Primmer, F. Macdonald.

STABLE MANAGEMENT—
Highland and Agricultural Society's Silver Medal—Mr. John Taylor.

JUNIOR ANATOMY—
Highland and Agricultural Society's Silver Medal—Mr. J. Rigby.
1st Class Certificates—Messrs. J. Rigby, R. H. Oddy, A. M. Wylie.

BIOLOGY—
Highland and Agricultural Society's Silver Medal—Mr. J. Rigby.

CHEMISTRY—
Highland and Agricultural Society's Silver Medal—Mr. J. Rigby.
1st Class Certificates—Messrs. J. Rigby, R. H. Oddy.

HISTOLOGY—
Medal—Mr. Percy Thexton.

PHYSICS—
Medal—Mr. R. H. Oddy.

CURATOR OF MUSEUM—
Medal—Mr. H. A. TURNER.

EDINBURGH VETERINARY MEDICAL SOCIETY—
"*Best Essay*"—*Silver Medal*—Mr. H. A. Turner.
1st Certificate—Mr. H. A. Turner.
2nd Certificate—J. A. Fearnside.
"*Best Communication*"—*Silver Medal*—Mr. J. Sheffield.
1st Certificate—Mr. J. Sheffield.
2nd Certificate—Mr. P. Reilly.
"*President's Special Essay*"—*Silver Medal*—Mr. J. A. Fearnside.
1st Certificate—Mr. J. A. Fearnside.
2nd Certificate—Mr. S. Gaiger.

In making the presentations he alluded to the change in behaviour of veterinary students, and with reference to the conduct of medical students on a recent occasion said as time passed the medical students would look up to the veterinary students as examples of what they ought to do and ought not to do. It was stated not very long ago that it would be an honour to a veterinary student to be permitted to sit on the same benches as a medical student. People who read this translated it in two ways. People with a twist in their minds read it the wrong way; those who read it right felt that it would be a great honour if the universities should open their classes to veterinary students, a thing that had not been done yet.

THE MOVEMENT TO LIVERPOOL.

He repudiated the suggestion that the movement that had taken place in connection with this College would tend to lower the standard. They had suffered as a profession from want of equipment, which arose from a want of money. The Government considered they ought to do for themselves, and they had done so hitherto. But the Government and the country made demands on the profession, and it was absolutely necessary, if they were to fill positions that were going to be made, that they should be much better educated than at the present time. They must know more than was possible under present circumstances. It was by getting the assistance of the Universities that they hoped to place veterinary surgeons on an equality with members of other learned professions, and enable them to compete with them for appointments which belonged properly to the veterinary profession.—(Applause.) Things were going on favourably in connection with Liverpool. He took it, and Liverpool took it, as a high compliment that people should oppose them. No one opposed anything that was not going to damage them, or make them work harder than in the past. He hoped that movement would do good both to the other College in Edinburgh and to the Glasgow and Dublin Colleges, and he did

not mind if it did good to the College in London also. (Laughter and applause.)

THE PRINCIPAL AND THE PROFESSION.

Dr. JOHN MACMILLAN, in moving a vote of thanks to Principal Williams, said they were glad the Government were putting him in that important position he was going to. He had raised the profession to a position and a status it never had before. In this connection Dr. Macmillan remarked upon the improved position of the veterinary surgeon in the army, and what they owed in this matter to Principal Williams. The proceedings then terminated.

YORKSHIRE COLLEGE, LEEDS.

RESULTS of the EXAMINATION for the NATIONAL DIPLOMA in AGRICULTURE on the 9th, 10th, 11th, and 12th of May, at the Yorkshire College, Leeds.

PART II.

28 students entered for this examination and 25 sat. Of the latter 20 passed and 5 failed. The following is a classification of the successes, and it will be noticed that the County Council Agricultural students at the Harris Institute stand third on a list of students sent from eight different colleges:—

The Yorkshire College, Leeds,	10
Harper-Adams Agricultural College,	3
The Harris Institute,	2
Aberdeen University,	1
Edinburgh University,	1
University College of Wales, Aberystwyth,	1
West of Scotland Agricultural College,	1
South-Eastern Agricultural College, Wye,	1
	20

PART I.

47 students entered for this examination and 46 sat. Of the latter 35 passed and 11 failed. The following is a classification of the successes, and it will be noticed that the Harris Institute stands first out of a list of students sent from ten different colleges:—

The Harris Institute,	8
The Yorkshire College, Leeds,	6
West of Scotland Agricultural College,	5
Royal College of Science, Dublin,	3
Durham College of Science, Newcastle,	3
Harper-Adams Agricultural College,	3
Holmes-Chapel Agricultural College,	3
University College of Wales, Aberystwyth,	2
Aspatria Agricultural College,	1
Uckfield Agricultural College,	1
	35

In the history of the National Diploma in Agriculture this is the first time that young women have competed, and the only two successful competitors are Lancashire County Council Agricultural students.

Original Papers.

PYROPLASMOSIS OF THE DONKEY.[1]

BY THOMAS H. DALE, M.R.C.V.S., DISTRICT VETERINARY SURGEON, POTCHEFSTROOM.

THE diseases of animals due to the presence of Protozoa in the blood have recently assumed so much importance that a special classification—*Pyroplasmosis*—has been adopted by the French Veterinarians. Nearly all the domesticated animals are now known to suffer from one or more diseases of this class. Up to the present, however, I am unaware that any writer has described a pyroplasmosis in the donkey.

HISTORY.

My first acquaintance with the disease dates from the 2nd of March of this year, when I was sent to investigate an outbreak of disease among donkeys at Lydenburg, and which was attended with heavy mortality. I made eight post-mortem examinations on the day of my arrival, and the appearances were so marked, so much alike in every case, and so different to anything I had seen before, that I came to the conclusion that they were suffering from an unknown specific blood disease. Since then I have had outbreaks all along the Waterberg district, among isolated spans belonging to settlers and farmers, and also among a large mob up the Aapies River.

The animals attacked do not appear to belong to any particular country, breed, age, or sex, but Colonial bred donkeys in most cases pass easily through the first or acute stage, and then recover without passing on to the second or chronic form; in fact, in some cases, were it not for the extremely high temperature, coupled with the fact of other animals in the same mob or span being affected, no suspicion of disease would arise, although a careful observer might notice the animal a little dull and off colour.

From this it will appear that native donkeys are practically immune, and this is so more or less, for although I have never seen one escape the disease if placed under the same conditions as imported donkeys, I have also never seen one die from it. The disease does not appear to be congenitally infectious. Foals of dams suffering from the disease in either of its stages appear to be quite immune, as although the mother may be a mere bag of bones the offspring thrive and do well, microscopic examination of blood-smears revealing no pyroplasma, and intravenous injection of blood from an infected animal causing no reaction, although this latter circumstance must not be taken as conclusive evidence of immunity, as the intravenous injection of virulent blood into healthy adult donkeys, mules, a dog, and rabbits caused no systematic disturbance whatever, thus by analogy leading us to the conclusion that there must be an intermediate host or carrier.

[1] A paper read before the Transvaal Veterinary Medical Association.

SYMPTOMS.

The period of incubation is not known. The disease is usually ushered in by symptoms of a very trivial character; in fact, in the acute or first stage the disease is very difficult to diagnose, especially at the outbreak, when one has had no previous cases and post-mortems to give a clue.

The animal usually stands apart from the others, and seldom lies down during this stage of the disease, appears dull, sleepy, and stumbles when walking, the skin is hot, there is thirst and often slight loss of appetite; the visible mucous membranes are clean, pale, and blanched, and not yellow or dirty as in equine malaria; this also applies to the conjunctival membranes, but the membrana nictitans is often the seat of dark patches of ecchymosis. A general or localised erythema usually makes its appearance during the first four or five days, with a vesicular eruption along each side of the spine, and occasionally on the muzzle, nose, and legs, below the knees and hocks; the vesicles afterwards become pustular, dry, and desquamate. The pulse is usually full, quick, and intermittent, but varies a great deal. The temperature is always very high in the acute stage, ranging from 105° to 107° F., and is generally over 106°, and lasting usually five or six days, when it drops suddenly to subnormal, where it remains until death or recovery. At the same time there is good reason to suppose that in some cases the period of fever is of longer duration; in one case at least the animal had a temperature until the ninth day, when it dropped suddenly, the patient dying a few hours later. In spite of this high temperature it is most marked that there are no rigors, and that the extremities, legs, ears, &c. are always warm, the respirations are not increased, there is no swelling or œdema of the sheath or extremities, no pain or colic, and no loss of flesh, although a marked change comes over the patient as soon as the temperature drops.

In the second or chronic form the disease is characterised by progressive anæmia and rapid loss of flesh, especially the muscles of the back and hind quarters. The animal walks in a straight line, as though trying to balance himself on a tight-rope, and looks neither to the right nor to the left: he often appears to be in a state of semi-coma. In some cases a partial paralysis of the hind quarters and sphincter ani, with consequent dilatation of the anus, is present, due, no doubt, to interference with the normal functions of the cord in the lower dorsal and lumbar regions, due to pressure caused by an exudate which is always present in greater or lesser quantities within the spinal membranes. The animal now becomes a sorry spectacle, for, in addition to the extreme emaciation, the hair falls out, and the skin peels off wherever there was rash. The action of the heart is irritable, irregular, and often tumultuous; the palpitations being heard some distance from the animal, and in fact are sometimes so violent as to cause the whole frame of the animal to shake. The pulse may be full and quick, weak and thready, or intermittent, but is of no diagnostic value whatever, as it entirely depends on the extent of the heart lesions. The breathing is quickened, but each individual respiration is shallow, and probably due to heart disturbance, as it is very unusual to find the lungs in anything but a normal condition.

The appetite will during this period have increased if anything, in fact in many cases the animal has a voracious appetite, and will eat to the last. The evacuations are little changed in character, but there is a

copious excretion of the urine, which is usually pale and watery, but in a small percentage of cases the condition of hæmoglobinurea is present.

Unless treatment is prompt and energetic, the animal gradually wastes away; the anæmia becomes more marked, the animal appears half asleep, has to be helped on to its legs in the morning, ultimately getting so weak that it lies prone for probably a couple of days, and dies without a struggle. In other cases complications may arise; and bowel troubles with colic occur occasionally, due to the animal being unable to digest, the result of an appetite which he is always ready to satisfy.

The different kinds of pneumonia, but principally those of a septic infection, also hasten the end, and I have also found inflammation of the bowels to be the immediate cause of death, but these have nothing whatever to do with the disease, and are due to the conditions under which the animals are placed when in such a low and debilitated state.

From this it will be seen that no symptom or group of symptoms is really specific; diagnosis in the first or acute stage is extremely difficult; at the same time the fact of the symptoms being of a negative character, coupled with the high temperature, gives one a clue. Blood-smears may confirm, or they may not, as the pyroplasma is not always present in the acute, and never in the second or chronic stage.

POST-MORTEM APPEARANCES.

In the first or acute stage there is usually nothing to mark externally; internally one cannot help noting the sort of parboiled appearance of the majority of the tissues. The liver is usually very much congested, with a yellow tinge, and its substance is also more or less broken down, but there is no jaundice or straining of the tissues.

The spleen is enlarged, but there is no breaking down of its structures; the kidneys are pale; all the other organs are more or less normal, and one is at a loss to explain death, except by the action of a toxic poison.

The post-mortem appearances of the second or chronic stage are, however, more marked. Externally, extreme emaciation is noted, pallid visible mucous membranes, and a more or less bare condition of the skin along each side of the spine, and down each hind quarter. On opening the animal it will be noted that there is marked anæmia, extreme pallidity of all the tissues, with sometimes an enormous serous effusion into the abdominal cavity, in fact at times there appears to be an acute dropsy. This effusion is not confined to the peritoneal cavity; there *may* be a slight effusion into the pleural cavity, but there is *always* an abnormal quantity of fluid in the pericardial sac, which is hæmolitic in a small percentage of cases.

In addition to petechiæ being found on the membrana nictitans, ecchymoses are occasionally found on the different mucous and serous surfaces, and D.V.S. Conacher states that he found hæmorrhagic patches in the intestines, but, as I have come across very few cases out of a very large number of post-mortems, and as I have already stated that I consider inflammation of the bowels to be a concurrent accidental condition, I have not included it in either ante- or post-mortem symptoms. There is no jaundice. The changes in the heart are most marked. The pericardium invariably contains an amber-coloured fluid, which in some cases is a deep port wine colour. The heart itself is very flabby and enlarged, and the

fat at its base and along the auricular ventricular furrow is replaced by an almost transparent gelatinous exudate, but it may be amber or pale green in colour. Although this condition is not specific to the disease under notice, it is invariably found, and is therefore of considerable diagnostic value.

Subendocardial ecchymoses are also often found, and it is very rarely one makes a post-mortem examination without finding ante-mortem clots in the heart, which extend along the course of the large blood-vessels, and this clotting is so perfect that by gentle traction one may pull out the clot for a considerable distance, showing the branching of the various vessels which they occupied. I have also found large and extensive ante-mortem clots in the blood-vessels of the hind limbs. The blood itself is notably pale in colour, and when the hand is dipped into it it runs off without leaving any stain. If placed upon a slide, or a piece of writing paper, the red corpuscles immediately run together in nests or groups, so that they become visible with translucent liquor sanguinis between.

The larynx, trachea, bronchi, pleura, and lungs present a perfectly normal appearance, but occasionally symptoms of bronchitis are present, and I have found several cases of septic pneumonia running either concurrently with the disease under notice, or induced by the lowered state of the general health, and the more or less insanitary conditions.

Nodules are also found occasionally in the lungs, due, no doubt, to some cestode which has undergone calcareous degeneration, but this has nothing to do with the disease.

The lymphatic glands throughout the body are more or less swollen, and often show hæmorrhagic infiltration. The mouth, pharynx, and œsophagus present no abnormal appearance.

Although there is usually an enormous serous effusion into the peritoneal cavity, there is no inflammation, either circumscribed or general; it is purely an exudate.

Out of the enormous number of post-mortems that I have made I have never found an abnormality of the stomach, but in one case examined by D.V.S. Conacher he found inflammation of this organ. This may have been an accidental occurrence.

The intestines are, as a rule, more or less normal, but pale in colour. They often contain enormous quantities of nematode worms, sclerostoma equinem and sclerostoma tetracanthum, so great in fact that one might easily jump to the conclusion that the presence of the worms was the cause of the disease; but this is not so. All parasites, whether internal or external, thrive and multiply when the body juices of their host lose their protective action from disease or debility, and these worms in question simply revel in the catarrhal condition of the mucosa, which is nearly always present.

In the earlier stages of the disease the liver is always enlarged, and often presents yellowish-white patches on its surface, which appear to be due to the thickening of the capsule, but as the disease assumes a chronic form cirrhosis takes place, with consequent contraction in at least 75 per cent. of cases.

In several cases I have found liver-flukes in great numbers, and also a few cases where the liver was simply studded with calcareous degenerations of cestode larvæ.

The spleen is always enlarged and pulpy, often broken down, and may

weigh anything up to 7 lbs.; in fact, its naked-eye appearance is that of an anthrax spleen.

The kidneys are always pale, and present a parboiled appearance.

The bladder, on post-mortem, is always enormously distended, usually with pale watery urine, but occasionally with blood-coloured, the organ itself presenting no abnormality.

The brain, as a rule, presents a perfectly normal appearance, except that there usually is fluid in the lateral ventricles, which is colourless or slightly tinged. There is nearly always an increase of fluid within the spinal membranes, and occasionally a gelatinous deposit in the lower dorsal and lumbar regions. These conditions probably account for the semi-coma and partial paralysis so often seen in this disease.

CAUSE OF THE DISEASE.

The cause of the disease was discovered by Dr. Theiler in blood-smears made from donkeys during the first outbreak, and I quote his report in his own words:—

"The cause of the disease is the presence of an endoglobular parasite invading the red blood corpuscles. It belongs to the ciass of pyroplasma, and is very closely related to if not identical with the pyroplasma found in the malarial or biliary fever of the horse and mule.

"The pyrosoma, as it was generally called in cattle, belongs to the same group, so also does the pyroplasma of biliary fever in the dog. The pyroplasma of the donkey is round in shape, and varies somewhat in size from about one-sixth to one-third of the red corpuscle in which it is found; pear-shaped or oval forms are exceptional.

"In staining with ordinary aniline dyes—methylene blue, for instance—the pyroplasma is recognised as a blue disc on the green-tinted corpuscle.

"In staining with eosin methylene blue mixture, specially known as Laveran's stain, and in mixtures of Asur II. with eosin, the finer structure of the pyroplasma is recognised. When stained a nucleus is seen which takes a red tinge. Around the nucleus (karysoma) the faintly bluish protoplasma of the parasite cell is recognised. Some four karysomes, and in a later stage we find each four karysomes, may be recognised in all forms of the pyroplasma, and varies according to the size of the latter.

"The largest forms which we recognise are apparently those which multiply by fission. Thus we recognise in one protoplasma four karysomes, and in a later stage we find each four karysomes separated, and surrounded by a small zone of bluish tinged protoplasma.

"This form resembles a rosette, and is very typical. In still later stages we find these rosettes completely separated; the newly formed pyroplasma leave the red corpuscle, and thus it happens that we find two parasites in one cell. We may, however, find three individual pyroplasmata which are either completely separated from each other or still hanging together. I have not been able to trace the pyroplasma outside the red corpuscle, but there is no doubt that it exists, as it does in biliary fever of the horse, in the plasma.

"The pyroplasma is usually found in acute cases. It may be in the blood, the heart muscle, or the liver, but it is found most abundantly in the spleen, where the forms of multiplication—the rosettes—are most frequently met with. So much does the pyroplasmata resemble in its

form and in its reproduction the pyroplasma found in horses and mules suffering from biliary fever, that one is struck with the idea that probably they are the same species, or varieties of the same species, of endoglobular parasite."

EXPERIMENTS.

Very little experimental work has been carried out, as those of us who have come in contact with the disease have had our hands too full to devote the necessary time and close observation demanded in research of this nature, and what little has been done is of a negative character.

1. A fairly young large Kaffir hound was inoculated at Lydenburg by D.V.S. Conacher and myself with blood from a donkey owned by the Public Works Department, suffering from the disease in the acute stage, with a temperature of 106—4°, pyroplasmata being afterwards found by Dr. Thieler in blood-smears obtained at the time of injection. The dog was forwarded to Dr. Thieler for observation. No reaction and no systematic disturbance took place; in fact the dog improved in condition. No pyroplasma were found, although the blood was examined daily for an extended period. The donkey from which the blood was taken ultimately died, and D.V.S. Conacher, who made a post-mortem, found the usual appearances.

2. Two rabbits inoculated with blood by Veterinary-Surgeon Pye at Lydenburg were sent to Dr. Thieler for observation. No reaction took place.

3. Three mules inoculated by myself with 50 c.c. of blood from donkeys in the second or chronic stage of the disease, and suffering from its sequelæ, caused no elevation of temperature, and no systematic or local reaction.

4. A healthy donkey was injected by myself with 88 c.c. of blood from a donkey in the second stage of the disease; the injection was made into the jugular. No reaction whatever took place.

5. Two healthy donkey foals, whose dams had suffered from the disease and recovered, were inoculated by me with 18 c.c. of blood from a donkey in the chronic stage of the disease. No reaction took place. No blood containing pyroplasmata was available at this time, as all the mob were in the second stage.

6. Struck by the similarity of many of the post-mortem appearances of this disease and tick fever in cattle, allowing for difference of species, D.V.S. Conacher was induced to inoculate a healthy donkey with 50 c.c. of virulent blood from a certified case of Rhodesian tick fever. The second day the temperature rose to 103° F., and then fell to 100·3°, ranging between that and 101·4°, until the sixth day, when he was unable to continue his observations through stress of work.

I am afraid that these experiments tell us very little, except that the disease is not contagious in the ordinary way, but by analogy we can assume that the hæmatozoon undergoes some metamorphosis, probably in the body of a tick by which it is carried, and the disease transmitted, as it has been proved to be in the case of redwater and the malarial biliary fever of dogs.

At one time I was of opinion that this disease was quite different to anything found in the horse or mule, but I have lately had occasion to modify my views, for not only have I seen something very similar, if not identical, in mules, and which I have not had time so far to investigate

but it will be seen that in many things the disease resembles equine malaria. The hæmatozoon is of the same type, the disease runs a very similar course, and although the clinical symptoms—especially in the acute form—vary considerably, this may be accounted for by difference of species. At the same time, although they are so very similar, I am of opinion that they are different and distinct diseases, caused by blood parasites that are possibly as nearly related to each other as the horse is to the ass,—one reason for coming to this conclusion, and a very important one, I think, being that I have inspected mobs of donkeys that were either healthy or suffering from worms or some other complaint, and been called in to attend cases of biliary fever among the conductors' horses used for herding donkeys. These were invariably imported horses, but so were the donkeys.

At the present time I am treating a mob of 1000 donkeys with pyroplasma disease, but the horses, to the number of a dozen or more, that herd with them, that mix with them, that eat the same grass, drink the same water, and get bitten by the same tick, are not only quite healthy, but are in the pink of condition; this also applies to the mules used for transport on the same depôt.

On a farm at Hartingsburg, near Warmbaths, I had twenty donkeys affected with this disease; eight were Argentines and twelve were South African bred. One, an Argentine, died in the acute stage before I arrived; another was very bad in the acute stage, with a temperature over 107° F., my prognosis being that he would die, but he recovered, with very little evidence of sequelæ. The other six had passed on to the second stage, and had subnormal temperatures; they all recovered, and are now at work. The twelve country-bred donkeys had all either been sick or had temperatures when I examined them, and, as is usually the case with native donkeys, passed through the acute form, recovered, and were the first to be at work. The only horse on the farm was never ailing for an hour, for though it was country bred, so were twelve of the donkeys, and if the diseases are caused by identical pyroplasmata, one would expect the horse to show it more than the donkeys, seeing that the symptoms of biliary fever of the horse are so much more marked during the acute stage.

From this it will be seen that it is possible to have equine malaria in contact with a herd of donkeys, and the donkeys not to be affected with the pyroplasma equi. It will be seen that it is possible to have 1000 donkeys suffering and dying with heavy mortality, and the horses which herd with them apparently possessing immunity.

TREATMENT.

The one redeeming feature of this disease is that it is amenable to treatment; prognosis, except where the animal has suffered from the disease for some time, and where organic changes have taken place, is always favourable, but it is essential that while treatment is going on the animal be treated as an invalid. He must have generous fare, food that he can easily digest, mashes made with boiled oats and mealies, with bran added until it is crumbly moist—not a nasty, sticky mess, as one so often sees in this country—and green food if it is obtainable.

In the first or acute stage, until the temperature drops, I have found the administration of 2 drachms of either ammonia carbonate or chloride,

combined with two drachms of sodæ hyposulphite, to be most effective, and if the heart is irritable, irregular, or tumultuous, as it often is, I have found a drachm of belladonna extract given as an electuary, or combined with ammonia and hyposulphite of soda, to have a marked and notable effect.

Immediately the fever abates, change the medicine to 3 grains of arsenic in a drachm of sulphur, given dry on the tongue once a day for ten days, then do nothing for two days, after which start the administration of tonics. I have found a drachm of finely pulverised ferri sulph., placed on the tongue in the same manner as the arsenic mixture, to act very well. I do not advise the administration of purgatives, even at the commencement of the attack, but if the animal is stall fed a couple of ounces of mag. sulph. in a bucket of water, left before the patient so that he can drink whenever he wishes to, is a great help in keeping the bowels in order, and also acts as a febrifuge.

Other drugs have been experimented with, and with success, especially carbolic acid, quinine, and salicylate of soda, but these drugs are not so convenient to use, especially if one has a large mob to dose. They are more expensive, and their exhibition has not proved so effective in my hands as those recommended.

In conclusion, I have to thank D.V.S. Conacher for much assistance, and I am under the greatest obligation to Dr. Thieler for his generous help and advice, for which I am grateful.

A CONTRIBUTION TO THE DIAGNOSIS OF HEARTWATER IN CATTLE.

BY DR. THIELER, GOVERNMENT VETERINARY BACTERIOLOGIST.

HEARTWATER in cattle is commonly spoken of in certain parts of the Transvaal as a disease probably similar, if not identical with the heart-water in sheep and goats, the main symptom being the enormous filling of the heart-bag with a clear or yellowish fluid.

Thanks to the investigations of Dr Hutcheon and his assistants, we have gained considerable knowledge about the nature of heartwater in sheep and goats. Mr. Lounsbury, entomologist of the Cape Colony, has made clear the mode of spreading and dissemination of the disease. The above-mentioned gentlemen have also demonstrated that heartwater in sheep and goat is trainsmissible to calves.

I propose to describe the chief characteristics of this inoculable disease. From my own observations, it would seem to be often, perhaps in the majority of cases, mistaken for some other maladies in cattle; it probably represents one form of gall sickness, and, as will be seen from the description of the symptoms, probably what is known as "dronkgall-sickness."

Before entering into a detailed description of several cases of heart-water in cattle, it will be necessary to speak shortly of the disease of the same name in sheep and goats, and to quote facts which have been ascertained in connection with it.

CAUSE OF THE DISEASE.

There is no doubt that heartwater is due to a micro-organism which

enters the blood-streams of animals. This opinion is based on the fact that the disease is easily communicated by inoculation with the blood of sick or recently recovered animals into healthy susceptible ones, from sheep to goat and cattle, and *vice versâ*. Blood seems to contain the virus under all circumstances; the disease is easily transmitted by subcutaneous inoculation, and more easily by injection into the jugular vein. The liquid of the heart-bag seems to fail to produce the disease in the majority of cases; anyhow, it failed in all my experiments. This indicates that the microbe has to be looked for in the blood, particularly in the red corpuscles. Up to the present every investigator who has conscientiously worked on the subject has failed to demonstrate this micro-organism, either by the microscope or by culture. These facts indicate a remarkable similarity between heartwater and horse-sickness. As far as I am aware, it has not yet been demonstrated that the virus of heartwater passes through a Berkefield or Chamberlain filter, as is the case in horse-sickness; on the contrary, experiments seem to indicate that such is not the case. Therefore the size of the micro-organism should come within the limit of visibility. Heartwater is one of the diseases which we cannot yet diagnose by the microscope, and the diagnosis will often be impossible, because the characteristic clinical symptoms are wanting, sometimes difficult, and then only based on circumstantial evidence.

After the inoculation of blood from a sick animal into a healthy one a certain period is required to lapse before any symptoms in the infected animal are observed. This time usually lasts from eight to ten days. It may be in exceptional cases as short as five days and as long as fifteen days. The disease itself may run on from two to six days, and even more.

SYMPTOMS OF HEARTWATER IN SHEEP AND GOATS.

The first sign is always a rise of temperature. This may be the only symptom, and the animal suddenly dies, although it seemed to be quite healthy. Usually, however, the fever keeps on rising, and may reach 106°, 107°, and even 108° Fahr. The sheep or goat may then stop feeding, become prostrated, and dies without any typical indication of its suffering from heartwater. A good many cases, however, sometimes show symptoms before death of a brain affection, so pronounced, indeed, that one is struck by the idea that the name of "brainwater" would better fit the disease than the one by which it is now known. For instance, a constant movement of the lower jaw, as if chewing something, is noticed, a constant movement of the tongue may be observed, extending and withdrawing it continually. In other cases the animal may be seen licking the ground. It continually turns around the post to which it may be tied, and all of a sudden drops to the ground; fits set in, the neck being extended backwards, and the legs kept in regular motion. These symptoms may pass to return, then they indicate the approach of death. Some of the animals bleat some time before they die, others pass away quietly.

The symptoms of the digestive organs may vary greatly. There is sometimes foam at the mouth, the throat may be slightly swollen, rumination may stop even before feeding; the bowels are usually normal, but in some cases the animal is slightly costive, and, again, diarrhœa may be present.

The symptoms may thus vary considerably, but I wish to lay particular stress on the symptoms caused by the diseased condition of the brain, as

described above, because, as it will be seen later, a striking resemblance occurs in cattle, whether they are artificially infected with the disease, or whether they contracted it naturally.

POST-MORTEM LESIONS.

The principal lesion in heartwater of sheep and goats is the increase of liquid in the heart-bag, which condition gave the disease its common name. This liquid coagulates easily soon after the bag is opened, and is sometimes even found coagulated in post mortem of some standing. The liquid is as a rule clear, but it may also be found blood-stained. It must be borne in mind here that not every excess of liquid in the pericardial sac has to be interpreted as being due to the malady in question. Cachectical condition of the body, due to bad pasture, infections by internal parasites, and other causes, may produce a similar collection of liquid. Here, however, one has nearly always to do with a poor carcase, whereas the same symptom in a good-conditioned animal points to the specific disease.

The pericardium itself is usually thickened, and has a gelatinous character, both in aspect and structure. In other cases, both the liquid in the bag and the derangement of the pericard may be missing.

The endocard (inner lining) of the left heart cavity has usually a mottled appearance, caused by blood spots, sometimes the hemorrhages are present in streaks and also in patches. The blood is generally well coagulated, the clot of normal consistency and colour. There is also liquid found in the pleural cavity, which behaves similar to the one found in the heart-bag. The lungs are often in a dropsical state, full of liquid in the interlobular tissue, which may be found distended, and there is then foam present in the bronchial tubes, and even the windpipe.

The abdominial organs may be found in a quite healthy condition. The spleen in the majority of cases slightly enlarged, and its pulpa is slightly softened. The liver may be found in a state of congestion, dark in colour, the gall bladder distended by a viscid, thickish green or yellow bile. The kidneys are sometimes also in a hyperæmic condition, which is indicated by the red colour of a section of that organ. The bladder may be full or empty, and the urine is always clear.

The intestinal tract shows different variations in the different cases. The third stomach may be found dry or soft, the mucous membrane of the stomach and bowels may be quite normal, but sometimes lesions of a slight catarrh, or even of a hæmorrhagic inflammation, are present. These conditions are indicated by a redness of the mucous membrane, which may be general, in streaks, in patches, or in form of a stronger filling of the blood-vessels, and forming then a distinct arborisation or tree-like appearance. The whole extension of the intestines, part or parts of it, may be involved in this pathological change. The membrane is usually thickened in such parts, and even a gelatinous infiltration of the mesentery belonging to it may be present. I have even noticed in exceptional cases that the mucous membrane of the lower part of the small intestine had become necrotic, and that the cæcum and colon had an exudation of blood on the surface. This is certainly, however, a rare occurrence.

GEOGRAPHICAL DISTRIBUTION OF HEARTWATER.

Heartwater of sheep and goats is met with only in a certain part of the

Transvaal, namely, in the bush veld. There sheep and goat breeding of high-bred animals is impossible, and only the common Kaffir goat and fat-tail sheep are found in any number, probably because these breeds have in the long run of time become immune. Not all parts of the bush veld are, however, equally bad, the worst ones are certainly the lower lying, and therefore also warmer, countries. The season also has some influence, inasmuch as during the summer time the disease is in parts more prevalent and virulent. Heartwater is a malady which seems to stick on the veld. The Boer farmers know that since ages, and accordingly, when an outbreak occurred in their flocks whilst they were in the winter veld a rapid change of field was made, when the disease would soon come to a standstill. They also know that heartwater is not contagious, and once a flock was out of a heartwater field, up again in the high veld, and mixed with other sheep or goats, such animals would not take the disease. We know now how to explain all these facts, thanks to the investigations of the Cape experts, especially Mr. Lounsbury. Heartwater is found in certain parts of the Cape Colony, namely, in Albany and the surrounding districts, where sheep breeding has nearly come to a standstill. Mr. Lounsbury found that heartwater is carried by a certain species of ticks, namely, the bont tick. In a series of most careful experiments, he has time after time reproduced the disease. In the last issue of this journal the above-mentioned gentleman has, in his paper on "Ticks and African Coast Fever," already indicated how the disease is communicated. Suffice to repeat, that the disease does not go from the female through the eggs, but is taken either by a larva or nympha from a sick animal and communicated in one of the following stages, either as nympha or then as an adult. Mr. Lounsbury was kind enough to send me heartwater infected nymphal ticks from Capetown. These were placed on goats in the Daspoort Laboratory, and the result was that all the goats infected contracted and died of heartwater in the stables, which they never had left.

Every careful observer knows that the bont tick is an inhabitant of the bush veld, and that, although it may be brought with cattle from that part into the high veld, and even stick on an animal for a considerable length of time, yet it does not breed there. In the neighbourhood of Pretoria we find it already behind the Magaliesberg, whereas it is not found on this side of the range. The bont ticks breeds only in warm fields, and where it finds protection in the bushes.

Heartwater is met with in the same parts of the Transvaal where the bont tick is found.

HEARTWATER CASES IN CATTLE.

The tenor of this article being of an inductive character, the enumeration of some carefully observed experimental cases of heartwater may illustrate points more clearly.

1. Calf heifer, Two years old. — An Africander heifer, about two years old, was injected on July 24th, 1903, with 10 cc. blood intrajugular. The blood was taken from a goat, which contracted heartwater from bont tick infection. Sixteen days later the temperature began to rise, became normal again after six days, during which time there seemed to be nothing amiss with the animal. When the temperature, however, rose to 105·6° the heifer was bled, and the defibrinated blood was injected into a

goat, a sheep, and a calf (about eighteen months old). The goat contracted the disease, so did the calf; it history is as follows:—

Case II.—On the ninth day after inoculation—this period represents the incubation time—the temperature rose and was high for four days, when the animal, which was feeding all the time, showed visible symptoms of sickness. On the morning of that day the animal had distinct attacks of fits, there was a constantly chewing movement of the lower jaw, just as if chewing the cud, and at the same time there was a constant nodding of the head, accompanied by extension and withdrawal of the tongue. A foamy saliva collected on the lips and the edges of the mouth, and dropped in long strings. The back of the animal was arched, the neck and head stretched out, the hind legs placed under the abdomen. When the animal was forced to move it did so with apparently stiff legs turned outside, and the walk was staggering, and it kept on moving until it dropped. It would then rise again, but all of a sudden intermittent spasms took place all over the body. These spasms may be produced by touching the animal, by forcing it to move, and by frightening it. I noticed them occurring as soon as a fly settled on the eyelids. Finally, the animal drops after most pitiful bellowing, struggling with the legs, with stretched-out head. It was then killed.

Post-mortem was made directly after death. The condition of the animal was good. The blood was normal, so was the appearance of the beef. The lungs were in a slight dropsical condition (œdema of the lungs); there was a little liquid in the heart-bag. The outside of the heart was diffusely studded with hæmorrhages, the lining of the left ventricle showed blood spots. The liver was normal, so was the gall bladder. The spleen was enlarged. Kidneys and urine were normal. The mucous membrane of the fourth stomach was thickened. The folds were swollen, the mucous membrane of the duodenum and all through the lengths of the smaller intestines and the colons were congested.

The microscopical examination of the blood gave negative results.

Case III.—Africander calf, about eighteen months old, was injected with 20 c.c. undefibrinated blood of a goat which was suffering from Heartwater. After an incubation time of six days the temperature began to rise, gradually ascending up to 106·8° in the evening of the eleventh day. The day after the temperature dropped, and at that time very serious brain symptoms developed. The calf turned constantly around the pole on which it was tied up; at intervals it dropped, rose again, and constantly pushed forward; the head was extended straight out; constant chewing movements of the lower jaws were present, and saliva beaten to foam hung around the lips. The eyes were staring, the eyeballs were slightly protruding, and the blood-vessels of the sklera were strongly congested. Finally, the calf dropped, not to get up again; fits set in all over the body; the head was extended, and convulsions followed. Death set in about eight hours after the first described symptom was noticed.

Post-mortem.—The condition of the animal was pretty good; rigor mortis was present. There was some liquid in the peritoneal cavity, and there were blood spots on the serosa of the intestines. The heart-bag contained about 5·00 c.c. of a slightly red tinged liquid. The blood was blackish, but well coagulated. There were blood spots on the lining of the left ventricle. The lungs were œdematous. The liver was of normal appearance. The gall bladder was contracted, and contained brown bile.

The kidneys were strongly reddened in section, the spleen was slightly enlarged. The mucous membrane of the fourth stomach was in a state of strong congestion, especially the fundus and pyloric parts; there were blood spots on different places. The mucosa of the duodenum were swollen and bile-stained. The mucosa of the smaller intestines had in the first parts a slate colour mixed with red patches and arborisation of the injected blood-vessels; the membrane is slightly thickened. Towards the end the mucous membrane of this particular intestine was still more swollen, the congestion stronger pronounced, and the hæmorrhagic patches more numerous. The cæcum and colon were strongly congested. There was a distinct increase of liquid in the chambers of the brain and under the dura mater. Increased liquid was also found in the spinal cords. Microscopical examination gave negative results.

Case IV.—Africander calf, about two years old, was injected with 20 c.c. undefibrinated blood into the jugular veln of a goat which was suffering from heartwater. After an incubation time of eleven days the rise of temperature began; the fever lasted five days. On the last but one day the calf was noticed to be very ill. It stood with a drooping head, taking no notice of what was happening around him. On the morning of the last day the animal was lying with extended head. There was slight diarrhœa present. Post-mortem was made about one hour after death. The condition of the cadaver was moderate. Rigor mortis was present. The blood was well coagulated and of normal colour, so was also the beef. There was some yellow liquid (about 500 c.c. in the pleural cavity.) The lungs were strongly œdematous, the interlobular spaces distended. The heart-bag was filled with yellow liquid, and enormously extended. The liquid coagulated rapidly after blood was added to it. The heart-bag was infiltrated with the same liquid, and had a gelatinous structure. There were blood spots on the lining of the left ventricle. The liver was congested, it had rather a reddish glossy appearance. The gall-bladder was half filled with normal bile. The spleen was normal, the kidneys were hyperæmic, and the urine was normal. The lymphatic glands of the mesentery were slightly enlarged. The fundus of the fourth stomach was deep red, with numerous blood spots. The mucous membrane was thickened, the folds standing prominently out. There was a slight catarrhalic condition of the duodenum; in the lower parts of the smaller intestines the swelling of the mucous membrane became very strong, the hyperæmic condition very pronounced, and numerous punctiform blood spots were present. In the cæcum, colon, and rectum was the congestion even more intense, and long red streaks were very marked. The whole picture called to mind similar conditions in rinderpest, with the difference that the Peyer's patches were not attacked. The brain was slightly hyperanæmic, the dura matter was slightly infiltrated with liquid; there was also some liquid under the dura matter.

ANALYSIS OF THE ABOVE CASES.

Out of four animals which were inoculated with heartwater blood, and sickened, three died. Five other animals of about the same age were treated in a similar way, but did not contract any disease from the injection.

The symptoms during life and after death show a certain resemblance both in heartwater of sheep and goats as well as in heartwater of cattle.

The striking symptom which gave the disease the name was, however, not always present, and is in cattle never so well pronounced. On the other hand, the lesions found in the bowels are less marked in sheep and goats, but distinctly so in cattle; indeed, the inflammation in these organs may be so severe that one suggests rather another disease than heartwater. The cases above related were due to infection with virulent blood. Mr. Lounsbury, however, has also produced heartwater in calves by placing bont nymphæ on them which had been feeding as larvæ on a sick goat; and by adults which had been feeding as nymphæ on sick cattle. The Cape experts also found that the lesions in the bowels are in cases of heartwater in cattle the most striking symptoms.

The disease is also transmissible back from sick cattle to sheep and goats, and, of course, from cattle to cattle, as has been already alluded to in the foregoing notes. In inoculating, however, sheep or goats with blood from sick cattle, one is struck that the typical lesions of heartwater are not always produced, as in cases of the disease brought on by ticks.

The Cape observers have noticed that, in the first instance, they found that the filling of the heart-bag with liquid was absent. I have observed the same also in one series of experiments, whereas in other cases the disease showed itself typically already in the first instance. There does not seem to exist any regularity as to the appearance or non-appearance of heart-bag fluid.

It remains to be stated that heartwater due to tick infection runs a longer incubation time than when due to injection of virulent blood. It may average about fifteen days.

CONCLUSIONS.

From the foregoing notes we may draw the following conclusions:—

1. Heartwater of sheep and goats is transmissible by inoculation of virulent blood from sheep and goat to cattle.

2. This transmission takes place under natural conditions by means of infected nymphal or adult bont ticks.

3. Although the disease in sheep and goats, on the one hand, and cattle on the other, are one and the same, yet the symptoms vary somewhat in their severity.

4. The inoculation of virulent blood from sick cattle to sheep and goats is not always followed by typical heartwater lesions.

DIFFERENTIAL DIAGNOSIS.

The foregoing notes may indicate that the diagnosis of heartwater in cattle may be difficult, almost impossible. In practice, only such cases are reported as heartwater which show the heart-bag bursting full with liquid. I am not yet convinced that this symptom is always due to heartwater, seeing that we find it very frequently in cases of Rhodesian tick fever. We are entitled to believe that it may be present in still other diseases of which we have but little knowledge. The most striking symtom was the inflammation of the bowels, but here again other diseases, such as rinderpest, Rhodesian tick fever, sometimes even ordinary redwater, gall-sickness due to vegetable poisoning, may produce the same effect. We may arrive at a diagnosis by exclusion of the different diseases, and be guided as follows:—

Heartwater is due to bont tick, therefore we find it only in such parts of the country where this tick exists; or in such cattle which have been removed out of a bont tick-infected field within a period of fourteen days to three weeks; secondly, the Transvaal cattle running in Tick fever area have a good immunity against the disease, therefore such cattle may first contract it that have been freshly imported into an infected field.

Rinderpest may be easily excluded by its lesions in the mouth, and especially Peyer's patches. Rhodesian tick fever is excluded by microscopical investigations in the first instance, and by such typical lesions as are met with in the kidney. A still further indication is to ascertain whether within a year, or even longer, cases of heartwater have occurred in sheep or goats in places where the cattle have been running.

Finally, an inoculation into sheep or goats may be necessary where, after exclusion of all other diseases, we wish under all circumstances to know whether heartwater is present or not. This experiment has enabled us to diagnose the disease in cattle which were suffering both from Rhodesian tick fever and heartwater. It must be taken into consideration here that goats or sheep infected may fail to show the liquid in the heart-bag.

I may allude here again to the fact that the symptoms detected during life were interpreted by farmers as being an indication of "dronkgall-sickness." We find symptoms indicating a derangement of the brain in redwater, Rhodesian tick fever, and rinderpest, but still they differ, inasmuch as the animal shows more of an aggressive attitude, and charges men without provocation. There is but little doubt that the majority of cases of heartwater come under the name of gall-sickness.

We may also state here that the popular observation of changing field, which is very often detrimental to cattle, may be explained as having some connection with the disease in question. It has been repeatedly observed that cattle, especially calves, which come from the high veld to the lower field do sometimes die there of what is called gall-sickness or bush-sickness. Others do not thrive well. Again, cattle from the Orange River Colony and some parts of the Cape suffer particularly from such diseases as are caused by change of field. Change of field is generally understood to mean change of grass, and the idea is that it is the difference of pasture which produces the disease.

We are also perfectly aware that outbreaks of ordinary redwater are traceable to the same change of field; indeed, here the conditions are very similar. It is the removal of cattle from non-infected to infected fields. The change of pasture, although the difference of grass may have an influence, probably plays only a subordinate *rôle*.

An experience made with cattle belonging to the rinderpest station furnishes a good illustration of this, and at the same time may serve as a guide how to arrive at a diagnosis.

The rinderpest station, Pretoria, used to import several lots of cattle from the Cape Colony, especially from the northern districts, where redwater or heartwater are unknown. During the course of immunisation against rinderpest such cattle became also immunised against ordinary redwater, this being a natural result of injection of blood from animals which are salted against ordinary redwater. The cattle were kept on the station tied up, and did well as long as they were under these conditions. It was found advisable, however, to move them to a farm behind the

Magaliesberg, where good pasture was obtainable. The result was that about three weeks after removal some of the cattle which came from the Cape began to die, whereas none of the Transvaal cattle, collected locally, died. The first, and natural, explanation of this mortality was change of field. Indeed, a good many cattle became very poor, and died of poverty. But some well-conditioned oxen died under rather alarming symptoms, which indicated that a specific disease must have been at the bottom of the trouble. The narration of two typical cases may be convincing that the disease was the same which has been described before, and which was due to the infection with blood from goats suffering unmistakeably from heartwater.

One Cape ox, two and a half years old, was hyperimmunised against rinderpest, arrived three days ago from Wonderboom, where he had been for some weeks. He was noticed to be ill since about two days, when he got suddenly bad, and could not get up any more. He showed spasms of the head, of the neck, and the front legs. Diarrhœa was present. He died during the night.

Post-mortem was made early in the morning. Condition was good. Rigor mortis was present. The beef had a normal colour; the blood was partially not coagulated. There was a yellow liquid in the peritoneal cavity. The lungs were slightly œdematous, so were the mediastinal lymphatic glands. The heart-bag contained a considerable amount of yellow liquid, which had rather a brownish tinge. The outside of the heart had a brick-red colour, and big red blackish hemorrhagic spots were on the left endocard. The liver was enlarged, and contained much blood. The walls of the bile bladder were thickened, and there was but little bile. The spleen was slightly congested, its pulpa softened. Both kidneys were deep red; the urine was normal.

The mucous membrane of the fourth stomach was much swollen, particularly in the folds, which were as thick as a finger. The pyloric part was reddened. The mucosa of the duodenum was bile-stained, that of the small intestines was reddened, the blood-vessels strongly injected; the contents of the bowels were of a brown-reddish colour. The lower part of the intestines were covered with mucus; there was a slate-grey discoloration present. Peyer's patches were normal. The mucous membrane of the cæcum and colon was thickened; there were grey and red patches; there were also red streaks in the rectum.

The brain was strongly congested. Microscopical examination of blood from the heart, liver, and spleen proved the absence of pyroplasmas of any description.

8th June 1903.—Cape ox, about three and a half years old. Same history as previous case. Was noticed to be ill since about a day, showing nervous symptoms, such as spasms of the head, extension and withdrawal of the tongue, biting the ground, staring look; when he finally dropped he kept moving his legs in a trotting action.

Post-mortem was made about an hour and a half after death. The condition was fair. Rigor mortis was not yet present; the blood was not yet coagulated. The beef had a normal colour. There was some liquid in the peritoneal cavity. The lungs were normal. The heart-bag was empty; the left ventricle showed blood spots. The liver was congested; the gall-bladder was thickened; the bile was viscid. The spleen was normal, so were the kidneys and urine.

The outside of the bowels was infiltrated with yellow liquid. The third stomach was somewhat dry. The fourth stomach had a swollen mucous membrane; the folds were very thick; the mucous membrane was uniformly reddened; and there were numerous hemorrhagic spots. The mucous lining of all the small intestines was generally congested and studded with fine blood-spots. Colon and cæcum were swollen, and on the mucosa were long hemorrhagic streaks, which extended into the rectum. The anus was deep red. Microscopical examination proved the absence of any blood parasites.

The diagnosis of the two cases was somewhat doubtful, and could only be arrived at *per exclusionem.*

Rinderpest, redwater of any form, had to be excluded. Vegetable poisoning was thought of, but had to be excluded too; there was no poison present at that particular time, and if it had been, then Transvaal cattle which were kept under the same conditions would also have sickened, which they did not. There remained the diagnosis of gall-sickness, which, as repeatedly has been pointed out, is a very vague term, and may mean anything or nothing. However, an examination of the skin of the cattle proved the presence of bont tick, and as engorged bont tick females were repeatedly found, there existed but little doubt that the tick was breeding on the farm. Moreover, some time previously sheep died on the place. Finally, the farm lies in the heartwater belt.

This circumstantial evidence taken into consideration, and the symptoms compared with those of the experimental cases, leave but little doubt that this form of gall-sickness, of which only Cape cattle recently imported died, was heartwater.

Unfortunately, the actual proof, namely, that of experimentally producing the disease in sheep or goats, was lacking, but from a practical point of view the necessary evidence for a deductive diagnosis was present.

EYE DISEASES OF THE HORSE IN SOUTH AFRICA.

BY CAPTAIN HERBERT GREENFIELD, A.V.D., KIRKEE, BOMBAY, INDIA.

(*Continued from page* 263.)

Breed of Horses affected.—In collecting figures to try and isolate the susceptibility of the various breeds of horses to those diseases, there appeared to be a slightly high proportion of North Americans and a rather low number of Colonial bred ponies attacked, but with the much longer exposure of the latter (and possibly other breeds) to the local influences it would seem possible that North Americans were considerably more liable to eye diseases, but there was no appreciable difference in the proportion of the other breeds attacked. Mules seem to be very resistant to ophthalmia, for in spite of their liability to infection when herded loose in dirty kraals cases of ophthalmia were uncommon and isolated.

Causation.—Although superficial ophthalmia may arise from any cause of irritation to the conjunctiva, it is probable the deeper condition is not so induced. In South Africa the constant exposure to dust storms, the fierce glare of the sun, and the attacks of flies all shared in producing the numerous cases of ophthalmia, but there is strong evidence that only indirectly and through these cases did they cause iritis. (For the nature of

development, through the deeper parts first, appears to preclude the possibility of superficial causation.) The more severe and disastrous form—sympathetic iritis—appears to have been subsequent, and this article attempts to prove, consequent to an acute attack of ophthalmia, at a length of time varying from four to twelve months after the original case, which original case frequently had either injury to the cornea or ulceration.

And my experience seems to prove that the iritis was produced by cases of ophthalmia being either untreated or improperly treated, in both of which the most important feature was that while suffering from the disease the eyes were protected from the sun only partially, improperly, or not at all.

How the iritis develops sympathetically (if it does so) is extremely difficult to assert; there is, however, very strong reason for believing that the inflammation spreads slowly from the primary eye affected, through the ciliary and optic nerves, or through the lymphatics of these nerves, to the opposite eye. Such an idea is supported by the fact that the horse develops stumbling and shying one to two months previous to the iritis being discoverable, and that, similar to other nervous conditions when developed, the symptoms are worse at night, while lastly, as in certain cerebral cases, a horse badly affected is much addicted to pawing.

I was particularly able to observe the premonitory symptoms as my own pony went through these stages, and he unfortunately became one of the worst cases, and was eventually incurable.

Pathology.—In a chronic case of iritis all the forms of inflammation may be seen in the affected eye; the changes of the iris are usually those of congestion and vascular stagnation. This produces the dulness of the anterior chamber by infiltration, which in turn accounts for some of the change of appearance in the iris itself, especially a peculiar "washy" look.

The lens capsule becomes opaque from chronic inflammation and cell multiplication, though its white appearance is sometimes due to refraction from a very convex lens (produced by ciliary congestion); at others it may be due to vitreous or choroid changes.

The contraction of the pupil is the result of either congestion of the iris, reflex irritation from pain of some sort in the eye, or synechial attachment between the iris and lens dependent on the stage of the disease. The tension of the eyeball varies very much; it is generally low, sometimes exeeedingly so; but in cases of ciliary congestion, with bulging over that zone, the tension is high, due to interference with the drainage by the swollen ciliary bodies.

Course.—The course of iritis is extremely persistent and variable; under the most favourable circumstances the lymph in the pupil descends and disorganises in the anterior chamber, where it is rapidly absorbed; the pupil then dilates, the injection of vessels decreases, and the cornea becomes gradually clear. But frequently the lymph is transformed to an organised and permanent attachment between the iris and the lens, often there is some ulceration of the cornea, and even with good progress the injected vessels of the circumcorneal ring leave large corneal streaks that are very resistant to treatment, but gradually improve with time.

Sometimes during treatment with mydriatics an attached iris tears and a false pupil is the sequel, while worst of all a proportion of cases remain with the pupils occluded, or with the iris firmly attached to the lens, so that the eye is quite incapable of accommodation, and the case is incurable.

Prognosis.—There are many guides to the probable course of the disease, and in all cases the more recent and within limits, the more acute the condition the more hopeful is its recovery, so that those with hypopyon, with disorganising or apparently soft lymph, are the most favourable cases, and a normal tension is always a decidedly good sign, while the most persistent and least promising are those old-standing cases which have glistening white synechiæ in a sunken eyeball, especially if the tension is very low.

Sight is not often permanently destroyed, although apparently very bad or quite gone during treatment (several ponies with very advanced iritis played polo regularly after treatment); but as a guide for prognosis the patients whose sight returns only very slowly after the eye becomes normal in appearance, are the most recurrent, and quite the most unfavourable.

Treatment.—So great is the difference in the characters of these two diseases, that the treatment of each must be studied quite independently, and not dealt with in an off-hand way. For as a result of their being so comparatively rare in England, is it not a common practice for us to have a stock remedy for all eye cases, and thus to tie ourselves to an empiric relic because of its comparative local unimportance? Firstly, in dealing with these diseases, before all methods it is essential in the treatment of both that the horse's eyes are protected from the light, which in nearly all cases in practice means covered, and it must be equally invariable that both eyes are covered thoroughly and continuously. (At the Cape I employed both flannel or fairly thick canvas, fastened on the inside of the two cheek pieces and nose-band of an ordinary cavalry head collar, with the top doubled over the broad band outwards, and found this the most complete and easy way of shading the eyes.)

Next, as to the method of dressing to be recommended; quiet injections of the solutions into the temporal canthus of the eye with the barrel of a hypodermic syringe is particularly good, as such ensures cleanliness, is easily done, prevents loss of dressing, and checks the amount used.

Acute Ophthalmia.—For the curative treatment of this condition almost any mild astringent lotion is sufficient if used carefully two, three, or four times a day. Perhaps the best general dressing is hyposulphate of soda, gr. xv. to the ℥ i. for this is safe even in the hands of the most careless dresser, and at the same time cheap, easy to dispense, and most successful. But zinc sulphate, grs. ii.–gr. iv., tincture of opium, ℥ i. to the ℥ i., is somewhat more useful, for the opium eases the pain if it is very acute, and zinc is stimulating to the cornea, and checks any tendency to ulceration, while it also promotes rapid healing.

As a preventative measure, many regiments in extremely dusty places had the eyelids of all horses cleaned twice a week with hyposulphate of soda solution, or mild boracic lotion, and this was considerably successful.

Chronic Iritis.—In this disease the prophylactic measures are of the highest importance, for if carefully maintained, there is very strong reason to believe this condition, so disastrous in effect and so resistant to treatment, may be prevented.

First. All irregular methods of treatment for simple cases by the misdirected zeal of officers and men should be checked.

Second. Acute cases must be treated by sufficiently mild dressings, and in every case proper shade to both eyes must be strictly enforced.

Third. If during the treatment of acute ophthalmia the pupil does not

dilate with shade and the eye improve rapidly, alternate collyria of atropine and eserine should be employed to prevent synechial adhesion.

Fourth. Development can often be checked and the case easily foretold if the eye is examined, either in a general inspection or in a special one, of those likely to be affected, *i.e.*, those with drooping eyelids, slight discharge, or horses known to have had ophthalmia.

Curative Treatment of iritis should be on the following lines:—

1. Reduction of congestion, pain, and irritation.
2. Attempt to produce mydriasis, to break down adhesion, or increase pupillary accommodation.
3. Try to induce absorption, to remove hypopyon or lymph, loose, plastic, or organised, as the case may be.

The two most ready methods to adopt are—shade to the eyes, to give rest and check irritation of light, to help in mydriasis; and heat, which can be most readily applied as thick flannel wrung out in hot clean water—this soothes the pain and promotes the softening and absorption of lymph.

Of drugs, sulphate of atropine is the most used. It allays irritation of the cornea, and is a strong mydriatic, but in many cases of adhesion it proves quite inoperative, even in strength of grs. iii.–grs. v. to the ℥ i., intensified by grs. v.–grs. x. of hydrochlorate of cocaine. Opposed by the difficulty of non-dilatation, experiments with the idea of softening the cornea with alkalies appeared to prove that these salts gave atropine, and possibly other drugs, greater penetration in the deep seated eye cases. Later, potassium bromide was introduced, with the nervous origin in view, and as the least irritant resolvent.

My most successful dressings, composed on these lines, was as follows:—

Atrop. sulph., gr. i.
Potass. bicarb., gr. v.
Potass. brom.
Potass. iodid., aa gr. x.
Aq. ad., ℥ i.

the dressing being injected three times a day.

Treatment must be carried on after both eyes become clear, until the pupils dilate equally, when the lotion is stopped, but the eyes kept shaded until mydriasis ceases, and then the horse must be gradually accustomed to light.

In very acute cases, with high tension and hæmorrhage into the anterior chamber, cold compresses are useful, but such cases are not common.

Some cases of "pannus," chronic keratitis, or "patchy cornea," left as a sequel to the circumcorneal ring, are much improved by painting with nitrate of silver grs. x. to ℥ i. of distilled water and then syringing with ordinary tap water immediately, but this must not be used if there is any inflammation.

Of other drugs tried for iritis, hyposulphite of soda was useless. Zinc sulphate, silver nitrate, zinc chloride, and glycerine all irritate the cornea, and are not curative. Hydrochloride of cocaine, both alone or with atropine, is resented for its primary irritation by the horses. Yellow oxide of mercury, alone or with the red biniodide, was rather irritant, rendering the

cases acute; but mild dressings, as that quoted above, produced great improvement after its use, so that such a combination suggests a form of tentative treatment for extremely chronic cases with old-standing synechiæ.

Extract of belladonna over the orbit was a very powerful mydriatic, but it is uncertain and difficult to regulate, and therefore liable to tear the iris.

Conclusion.—The results of this treatment in South Africa induced me to believe that 50-70 per cent. of cases were cured; 25-35 per cent. partially cured, possibly recurrent; and 5-15 per cent. incurable; but with only the opportunity of four months on this theory and method, I put forward this paper (particularly the hopeful figures) with the utmost diffidence as the results of only a partially completed work.

TWO OBSCURE CEREBRAL CASES.

BY CAPT. H. A. SULLIVAN, A.V.D., PRINCIPAL, POONA VETERINARY SCHOOL, INDIA.

IN the hope that these notes on two very obscure cerebral cases may prove of interest to some of your readers I send the following:—

In August 1902 I was stationed at Umballa, in the Punjab, and a big artillery waler mare was sent into hospital from exercise, with the information that she had been bleeding from the nose. The bleeding had stopped when she arrived, and an examination of the nostrils with the rhinoscope revealing nothing. She was placed in a cool stable, and two days later returned to work, as I put the matter down to the intense heat prevailing at the time. About three days later, however, she returned for the same complaint, and on this occasion I determined before returning her to duty to give her a gallop. Accordingly I had her mounted, but before she had gone ten yards her hind legs gave way, she fell backwards and rolled over, her tongue became perfectly blue, and I thought she was going to die there and then. I had the girths undone at once and let her lie still for a few minutes, after which she got up and I had her led quietly to a loose box which had been prepared for her. There was a good deal of yellowish discharge now from the right nostril. I left her quite quiet till the following morning, when I got her out, and having thoroughly examined the nostrils and found nothing, I put a "Revelation" mouth gag into her mouth and thoroughly examined the back of the throat by reflected light, but could find nothing whatever.

From the discharge I was led to infer that there was an abscess, probably post-pharyngeal, which, by pressure on one of the larger cerebral veins, retarded the flow of blood from that organ and thus brought about a sort of apoplectic fit. Acting on this belief the treatment I adopted was as follows:—I first of all ordered a 5½ drachm physic ball, and as soon as this had acted I gave ounce doses daily of potassium iodide. After eight days' treatment I put a man on her back and had her walked twice round a large paddock; the following day she trotted once round, and I thus gradually increased her exercise, so that by the time that she had been sixteen days under treatment and had received 1 lb. of potassium iodide, she was able to gallop several times round the paddock without ill effect.

I saw the mare a year after and inquired if she ever had a recurrence of this, and received a reply in the negative, and beyond thinking the case a

curious one dismissed it from my mind, and had it not been for the following one it would never have appeared in print.

Case 2.—About the middle of January 1903, about three months after I had taken up my appointment at this school, Major Elliot, R.A.M.C., asked me if I would have a look at a mare of his, and gave me the following history of the case. He said, "I was out riding with my wife, who was on this mare, and she was cantering quietly along, when all of a sudden the mare fell down as though she was shot, and my wife said afterwards she thought the mare had broken her leg, she came down so suddenly. There was nothing in the road to account for it. The following day I rode the mare, and whilst cantering quietly along she came down just as my wife described it, as though she had broken her leg. The next morning I mounted a riding boy on the mare and rode alongside of him when exactly the same thing occurred again; after each fall the mare got up as though nothing had happened."

The case interested me not a little in view of my former experience, and I put a man on her and took her for a canter in a circle just outside the hospital. He cantered thus for about three minutes, when I pulled him up close to where we stood. In a moment her eye assumed a peculiar look, such as might be seen when there is a rush of blood to the head, and her hind leg gave way under her and she fell over, to get up in a moment after looking quite unconcerned.

The owner wanted to know the cause and all about it, but of course it was impossible for me to say more about it than that there was presumably a rush of blood to the head, probably caused by the pressure of some abnormal growth which pressed on the larger cerebral veins, causing retardation of the blood-flow from the brain, resulting in a fit, and I then told him of my former experience, and he left the mare with me for treatment.

The treatment adopted was precisely the same as before, and I gradually increased her work until she could gallop two or three miles without difficulty, and then she was sent out. She has now been regularly ridden for the last two months without any reccurrence of the trouble, and I do not think from my former experience that she ever will have.

I have given a careful description of the symptoms, and treatment of two similar cases, such as I have never seen or read of before, and if any of your readers will kindly furnish me with information regarding the exact cause I shall feel deeply grateful.

PARALYSIS FROM CEREBRAL HÆMORRHAGE.

BY MAJOR E. TAYLOR, A.V.D., COLCHESTER.

A ROAN troop mare, seven years old, was admitted to the sick lines on the 21st March with the following symptoms:—Partial loss of control over all the limbs, reeled in gait, pulse full and strong, temperature 102°, eyes staring and wild-looking, excited and nervous. Head turned to the near side, nozzle and lower lip drawn to the off side, lower lip pendulous, particularly on the near side, cheek on near side œdematous and flabby. Loins arched, loin muscles appeared swollen and soft, but not tender on pressure. Urine passed frequently in small quantities, urine thick and white. The nozzle and lips indicate hemiplegia, the off and near

limbs are equally affected. Treated with physic—belladonna and sulphate of magnesia.

The bowels acted freely, and a little temporary improvement was shown, all excitement subsiding. The magnes. sulphate was continued, and potass. iodide given daily.

The paralysis, however, gradually increased. Feeds well but slowly, has difficulty in collecting the food, but eats long hay freely. Soft food collects in the lower lip and cheek on the near side. Tongue not paralysed.

On the 6th April the mare was destroyed, as for two days she had been unable to get up or stand when raised. On post-mortem examination a large blood clot was found at the base of the cerebellum between it, the medulla, and vermiform processes. The bladder was empty. All internal organs healthy.

This mare had been very unsteady in the ranks, and had been sent back to the riding-school for further training. Injury was suspected, but no history of any could be obtained, nor was there any trace of it on post-mortem.

During the time the mare was under treatment, she showed the greatest disinclination to pass through a doorway, and could only with difficulty be got in or out of the box. This, of course, indicates injury to the poll, but beyond the extravasation described there was no trace of such. The temperature never exceeded 102°.

CASE OF EPILEPSY.

BY MAJOR E. TAYLOR, A.V.D., COLCHESTER.

A BAY mare polo pony, seven years old, played an easy 'chukker' at 4 P.M. on the 11th inst.; was thought to be a little below par at the time. After the game, was ridden home by the groom a distance of two miles, and immediately after returning to the stable about six o'clock staggered and fell.

I saw the animal at 7·30, when she had already had five fits. She was then standing perfectly quiet, dull and listless, pulse imperceptible at the jaw, artery could scarcely be felt, heart's action feeble and fluttering, legs and ears cold, body bedewed with cold sweat, temperature 102° (was 103° at 6·15), conjunctiva injected, normal urine had been passed, respiration normal.

Whilst examining her she began to stagger and stare, fell and was violently convulsed; head drawn back, limbs rigid, strained violently, and passed some fæces; respiration sighing. After the convulsions the mare lay quiet for about ten minutes, then got up, but almost at once fell again, the attack being less severe than the one described.

She was treated with spts. æther. nit., liq. ammon., acet. ext. belladonna, and liberal doses of magnesa sulphas; a 40-grain dose of calomel being also given on the tongue, mixed with treacle. She took the draught fairly well, and drank greedily. She had the last attack about 9·30 P.M., nine in all, and is now (17th) doing well, and so far there has been no recurrence.

The mare had played two fairly fast chukkers on the 8th, and appeared to be none the worse. She has always been a little nervous and excitable, but during the year I have known her has been in regular work.

ABSCESS OF THE LIVER IN A HORSE.

BY CAPTAIN A. ENGLAND, ARMY VETERINARY DEPARTMENT, SHORNCLIFFE.

THE patient, a fourteen-year-old mare, was admitted to the sick lines on 3rd May, sent in from the drill field, very exhausted, and with difficulty walked back. She had been reported somewhat off feed the day before.

On admission the temperature was 105·4°, very dull and listless, pulse feeble, and visible mucous membranes a deep yellow colour.

℥viij. mag. sulph. with spt. aeth. nit. were given at once. Patient was placed in a loose box, rugged and bandaged, and fed on soft bran. On the third day the temperature sank to 103° F., but the mare continued very dull and listless, refusing food, excepting a little grass she was allowed to nibble during the heat of the day. Gruel she would not take, but was drenched with it. Small doses of mag. sulph. ℥ij. was given in the gruel three times daily, and skin liniment rubbed on her. She was never purged, but dung soft and very slimy, urine highly coloured and very thick. The temperature again rose gradually every day until the 8th day, when it was 104·4°. The patient did not lie down from time of admission until the evening she died. At evening stables on the 11th May the animal was noticed to be showing signs of colicky pain, blowing very heavily; respirations 50 per minute; temperature, 104·4°; pulse imperceptible. I was sent for, but the mare died immediately before my arrival.

The principal symptoms noticed were, in addition to the highly congested and yellow membranes and urine, the extreme dulness and listlessness of the patient. There was also dulness on percussion over the liver, but no pitting on pressure.

Post-mortem.—On opening the abdomen the liver was at once noticeable by the enormous size of the left lobe, and its dark, almost black, yellow colour; it was round and hard, like a football—the whole organ was a deep yellow colour, but the left lobe was a much darker and yellower, and on squeezing with the hand it broke down and revealed an abscess containing about a pint of thick yellow pus. This lobe had a considerable attachment to the diaphragm. There was a considerable amount of inflammation throughout the intestines.

The liver lesions must have been of very long standing, but there were no entries of any previous illness against the mare.

Translations and Extracts.

PSEUDO-PERICARDITIS CAUSED BY A CYSTIC TUMOUR IN THE ANTERIOR MEDIASTINUM.

CLINICAL LECTURE BY PROFESSOR G. MOUSSU, ALFORT.

GENTLEMEN—For several years past I have been in the habit of applying the designation "pseudo-pericarditis" to those conditions that give rise to symptoms identical with those of exudative pericarditis, and I allude more particularly to those lesions in the neighbourhood of the heart.

Such lesions as pericarditis are generally caused by foreign bodies penetrating through the walls of the stomach and lodging either in the fatty mass at the apex of the heart, giving rise to intrapericardiac abscess, or in the

thickness of the sternal angle, underneath either the right or left pleural sac, causing subpleural abscess. These abscesses, however, are not the only factors capable of giving rise to symptoms resembling pericarditis, because in reality they only act indirectly and mechanically, pressing on the heart and obstructing the return circulation.

Whatever may be the origin of this pressure, any obstruction to the return flow of blood in the anterior vena cava will give rise to a certain group of symptoms, and as there are numerous causes that will give rise to such pressure, it is in practice impossible to accurately diagnose them.

The case I now bring to your notice was sent to the College by M. Morin of Gournay with the following history:—Towards the middle of March the owner noticed an enlargement of the dewlap, but the appetite was good, and the cow did not go off in her milk; some stimulating liniment was applied, but without any result, the enlargement gradually increasing. On March 28th M. Morin was called in, who advised the owner to send the cow to the College.

M. Morin sends the following notes:—Large swelling of the dewlap, extending down between the fore-arms as far back as the enciform cartilage; œdema under the hypochondriac region, but which does not appear to be connected with the dewlap. Jugulars greatly distended, but no jugular pulse; no œdema under the jaw; pulse at submaxillary artery imperceptible; respiration quickened but regular; heart-beats normal; no appetite. These symptoms appear to indicate the probable existence of a tumour at the entrance of the chest, but as they have considerably altered since the patient has been in the College infirmary, I will mention what has taken place.

When admitted the patient was in a very bad condition—dull, and with an anxious expression. What first struck one was the enormous œdema of the dewlap, which was sensitive, hot, and pitted on pressure. It extended two-thirds of the way up the neck in front, and posteriorly back over the ribs. There was a soft swelling over the lower part of the right side of the chest, which was in marked contrast with the left.

The jugular channels were nearly obliterated, but the veins could be distinguished; they were enormously distended, the size of a child's arm, quite rigid, and buried in the infiltration in the connective tissue. The respirations were quickened, slightly discordant, and accompanied by a painful cough, but there was no nasal discharge. The shoulder and elbow joints were turned out. At first sight the case appeared to be one of exudative pericarditis, but a detailed examination negatived this supposition. Exploration of the thorax gave the following indication:—

Percussion.—Resonance normal on the left side, slight dulness over the cardiac zone; on the right, resonance normal in the upper and middle region—dulness over the lower portion of the thorax, no pain exhibited on percussion.

Auscultation.—Respiration on the left side regular, the vesicular murmur very clear and distinct; on the right, in the upper part, exaggerated but regular; in the upper and middle third, mucus rales and weak vesicular murmur, following the line of dulness; in the subscapular region and lower third of the lung complete silence. If the body were shaken in a transverse direction, at the upper border of the dull zone a noise of the regurgitation of fluid could be detected.

The sounds of the heart were regular but feeble, but slightly louder at the middle third of the scapula; that is to say, slightly *above* the normal point. It would appear, therefore, that the heart was slightly raised from

the sternum and suspended in the thorax. The temperature was normal, and the examination of the other organs did not disclose anything.

Diagnosis.—The supposition of pericarditis or organic lesions of the heart can be eliminated, as examination of that organ has been negative. The suggestion of M. Morin—"a tumour at the entrance to the chest"—explains the œdema and condition of the jugulars, but in spite of the infiltration into the dewlap the prepectoral glands are healthy and the trachea and œsophagus are patent. The hypothesis of the existence of a tumour (which theoretically should be a lymphoma or lympho-sarcoma) can be put on one side, as the examination of the blood has been negative, there being only slight leucocytosis, which renders it difficult to explain the existence of a large collection of fluid in the right pleural sac.

We must therefore fall back on the supposition of the existence of pseudo-pericarditis, caused by encystic pleurisy or a subpleural abscess on the right side. Either one or the other would explain the consolidation and different infiltration of the right thorax wall, the displacement and compression of the heart, the œdema, normal temperature—all of which might be expected in a case of pericarditis caused by a foreign body.

Prognosis.—This must be reserved, as in such cases before operation it is impossible to say what can be done in the way of relief, or what complications there may be.

Treatment.—There is only one line indicated, viz., to recognise the nature of the lesion, and with this object, after an exploratory puncture, I have with Potain's apparatus aspirated the chest in the most dependent portion of the fifth intercostal space on the right side, and withdrawn seventeen litres of a red-tinged fluid that has no smell, of which this is a specimen. A collodion dressing has been applied to the puncture. The patient has been greatly relieved, and the same day fed with a good appetite; the movements of respiration became normal in forty-eight hours.

Auscultation a few hours after the operation showed that there was a respiratory murmur at the lower part of the chest, the right lung having assumed its normal position.

We can now definitely say that there is not encystic pleurisy, but that there is something more; for, gentlemen, the results have been contrary to my expectations.

We must also abandon all thoughts of a foreign body, as the fluid withdrawn presents no appearance of pus from an abscess of this nature; in fact, when centrifuged, and the red corpuscles precipitated, it had all the characteristics of blood serum. This leads one to think of a simple hemorrhagic pleurisy, the cause of which is unknown. But exudative pleurisy is exceedingly rare in cattle; even in cases of tuberculosis with pleural complications it is exceptional to find such extensive effusion, and the animal is not tuberculous, having been submitted to the tuberculin test. The evacuation of the fluid from the right side of the chest has shown that the anterior lobes of both lungs are intact and permeable to air, and the diagnosis of hemorrhagic pleurisy appears to be reasonable, which is strengthened by the facts that during the past few weeks the animal has greatly improved, the œdema of the dewlap being greatly diminished, also that the jugulars not so distended, the respirations regular, and the appetite good.

The cow was far gone in calf, and in due course calved without difficulty, but since then one complication has succeeded another, and at the present moment the case is hopeless. There was retention of the mem-

branes which required operative interference on the third day, followed with a severe attack of metritis, which, however, yielded to treatment. On the eighth day after calving she was attacked with exudative arthritis in the left fore fetlock joint, which also yielded to treatment, and on recovering from this diarrhœa and subacute mammitis.

I only mention these complications to show that our patient is under the influence of a general infection.

The first improvement was not maintained, and on May 22nd, that is three weeks after calving, the intrathoracic œdema and pleural effusion reappeared, together with a feeble and continuous groaning when lying down. The effusion, which was at first slight, assumed the same proportion as before the operation, and the lung, displaced upwards, gave no sound in the right lower half.

It could be plainly seen that the period of expiration is the same as inspiration, and that this latter is performed in two movements; also that there was a wheezing bronchial murmur in the anterior lobe of the lungs. On May 27th the fluid in the chest had risen above the primary level. and a fresh puncture was made, 19 litres of fluid similar to that first evacuated being drawn off.

If there was nothing but pleural exudation it would be difficult to account for its causing venous stains and the remarkable œdema of the dewlap and neck, as both of these disappeared after it had been removed. Furthermore, there was marked general improvement, although it was temporary. On the other hand, we cannot explain why, after an interval of three weeks, the effusion is suddenly reproduced, without any exciting cause, in the course of a few days.

If the fluid had been formed in the first few days after the first operation I could have understood it, as it is only what might have been expected, but its sudden and unexpected reappearance makes us think of some form of pleuro-pneumonia.

No doubt what has been learned by the stethoscope negatives this, but the clinical signs present to me such complications that we may be permitted to consider the possibility of chronic pleuro-pneumonia.

We well know that in the chronic form the pulmonary lesions predominate, but in spite of the pleural exudation and absence of cardiac or pulmonary symptoms, it appears only reasonable to suspect some specific lesion capable of causing the external manifestations that your attention has been called to.

To make certain, a rabbit was inoculated with 5 c.c. of the thoracic fluid from the second operation. It died on the third day, proving that the case was not one of pleuro pneumonia.

We have now come to the proposition of a lesion of the mediastinum being the exciting cause of a pseudo-pericarditis and pleural complications. I must confess that this now appears the most probable, but not one of the lympho-sarcomatous tumours that are not uncommonly met with, and the reasons for excluding this cause have already been explained.

Very shortly after the second operation the fluid again formed in the pleuro, and on the 31st May the chest had to be tapped for the third time, 13 litres of fluid being evacuated, since which the appetite has been very poor and the chest was in forty-eight hours again filled up. The difficulty in breathing is very great, and fluid is forming on the left side in a considerable quantity, although not so much as on the right. There is pleuritic crepitation on the right side, and certainly œdema of both lungs, giving rise to cough and frothy discharge.

The chest will be again tapped to prevent death from asphyxia, but I do not think it will long delay the end.

June 13th, 1903.—The chest has been tapped for the fourth time, 19½ litres being removed from the right and 7 from the left side. The patient refused all food; the exudation quickly re-formed, and the death took place to-day.

On post-mortem examination the abdominal viscera are, as you can see, perfectly healthy, but the thorax contained about 20 litres of fluid. The pulmonary tissue is healthy, but the pleuro is greatly thickened and covered with false membranes, which at the lower part are firmly adherent.

Directly under the heart on the sternum and in the mediastinum are two large cysts with their walls containing a fluid as black as ink.

The subpericardiac pouch contained about 5 litres of fluid, and has raised up the heart, deforming the point, which was rounded and flattened, and the extremities of both ventricles are on the same level. The heart is soft, flabby, undergoing fatty degeneration, and a third smaller than natural, but there is no pericarditis, and the valves are intact.

The mediastinal pouch contained about 3 litres; it was in contact in front with the auricles, and pressing on the anterior vena cava. The lymphatic glands were healthy.

It is impossible to say what the origin of these cysts is, but they very much resemble hydatids.

The case, gentlemen, should bring home to you how difficult it is sometimes to make an exact diagnosis, and how important it is when possible to make a careful post-mortem examination.

(*Recueil de Médecine Vétérinaire, 15th* December 1903.)

ACUTE INTERMITTENT ROARING.

BY M. LEON DUPAS, V.S., 31ST REGIMENT ARTILLERY, FRENCH ARMY.

A CASE came under my notice lately of intermittent roaring that twice came on suddenly, the cause of which is unknown. I only relate the facts, without venturing on any theories as to its cause. I was called to the patient, a six-year-old mare, at 11 A.M. on March 11th, that had been suddenly attacked with a violent paroxysm of roaring about a quarter of an hour after she had been at exercise in the riding school. She was just being started at a canter when the attack came on, causing her to fall. The patient was standing in the middle of the school, with her head down, dark-coloured clotted blood running from both nostrils, "which were widely dilated," and the mouth. The mare was walked slowly to the infirmary, but even in that short distance the roaring became very acute and could be heard a long distance away.

There was an anxious expression about the face; the mucous membrane of a violet colour; thick black blood running from the nose and mouth; perspiration; respiration abdominal and performed with an effort; the fore limbs spread out; the hind-quarters swaying from side to side, as if the animal was about to fall, and asphyxia imminent.

Tracheotomy was performed, giving instant relief. The mare was well groomed, put into a box, and readily drank a bucketful of gruel. In two hours the conjunctiva assumed its normal colour, the temperature being 37·8.

An examination of the nose, mouth, and larynx was made, with negative results, and before this attack the respirations were normal.

The next day the general state of health was good, the tube was closed with an indiarubber plug, and the patient exercised for five minutes at a trot without causing the slightest inconvenience; the tube was left in position, and the wound irrigated with a 2 per cent. carbolic solution.

The tube was removed on March 14th, and the patient appeared to be doing well till the evening of the 15th, when, after her evening feed, the roaring recommenced, at first a slight whistling, but very soon as loud as before, the mare having a portion of hay in her mouth which she was about to eat. The wound in the trachea was reopened, the tube inserted, and instant relief given. This second attack aroused my suspicions of a pedunculated tumour, that by work or the movement of the jaws in masticating temporarily obstructed the glottis, but a careful examination did not disclose anything.

March 6.—There was a discharge of fœtid blood-stained mucus from the tube; the pulse was quick and small; temperature 39° Cent., and rigors. Sinapisms with friction applied to the limbs and antiseptics to the wound several times daily. The tube was changed morning and evening. The case went on well. As the tracheotomy tube had to be continually worn the mare was considered to be unfit for military service and was sold on March 20th.

(*Recueil de Médecine Vétérinaire*, 15th Feb. 1904.)

CEREBRAL TUMOUR IN THE HORSE.

BY MM. R. BISSAUGE AND NAUDIN, ORLEANS.

CEREBRAL tumours are of such rare occurrence in veterinary medicine, and the effects they produce are so variable, that they are worth while recording, especially when the subject can be kept under observation, and a post-mortem made.

The subject was a heavy draught horse, eleven years, purchased at a small price by a timber merchant in the city of Orleans. The animal appeared to be dull, clumsy in his movements, and took but little notice of his surroundings; his appetite, however, remained good, and he was well fed. Three weeks after his purchase, after a hard day's work in the hot weather, he had a severe attack of cerebral congestion, with great depression, somnolence, difficulty in moving, head being low, pulse full and irregular, but no fever. Under appropriate treatment the patient recovered, and resumed his work in five or six days.

The heat of the weather, hard work, and good feeding increased the symptoms, and the animal remained in this state for six months, when, again, after a hard day's work, he suffered from cerebral congestion, from which he recovered. He was then sold to work in the mines of Puy de Dome, but was returned to Orleans. The horse became worse, and appeared to take no notice of anything, all his movements being automatic. He would not eat hay from the rack, but would do so from the ground, frequently stopping in the middle of the process of mastication; but it is noticeable that he was always able to back without difficulty. As he was useless he was destroyed on 3rd July 1903.

A post-mortem examination was made immediately after, but nothing was noticed in the thoracic or abdominal viscera.

The brain was removed from the cranium, the meninges were healthy, but when removed the following lesions were found :—

The left hemisphere was about one-third larger than the right, which was pushed on one side, distorting the chiasma of the optic nerves, which, instead of being divided into two equal portions in the median plane of the brain, was lodged under the left hemisphere; only the hemispheres were distorted, the rest of the brain was perfectly normal.

On the lower surface of the left hemisphere, at its anterior third, a little in front of the point of union of the roots of the olfactory lobules, and about three-quarters of an inch from the interhemispheric fissure, the surface of the brain, for about the size of a franc piece, was irregularly rounded, lobulated, and of a greyish colour, studded over with white roughened points that were hard to the touch. The surrounding tissues, although normal in aspect, gave a sensation to the finger as if there was a hard body embedded in it, more especially posteriorly at the chiasma.

Longitudinal sections were made, but only the hemisphere appeared to be implicated.

The corticular portion of the right hemisphere was thinner than natural, apparently from pressure by the lateral ventricle, which was full of a bright yellow fluid, and which stained the walls. The plexus appeared to be normal.

In the left lateral ventricle was a tumour $3\frac{1}{2}$ in. long by $1\frac{3}{8}$ in. wide, filling up the whole ventricle, which also contained a small quantity of fluid. It was only adherent at the plexus choroides, and there very slightly. The brain substance was considerably absorbed, especially the floor of the ventricle, through which the growth protruded. When separated from the brain it weighed a little over two ounces, was tough, and grated under the knife. On section its surface was of a grey colour, studded over with easily detachable white granules, and of a hard, gritty consistency.

The interesting features of the case are (1) that there were never any symptoms of vertigo, epilepsy, or paralysis ; (2) the horse was always able to back ; (3) the comparative absence of nervous symptoms, considering the size of the tumour, which can be accounted for by its slow growth.

(*Recueil de Médecine Veterinaire*, Jan. 15, 1904.)

To our Readers.

We beg to announce that with the January number a series of Original Articles is commenced, from the pen of Lieut.-Colonel Nunn, on "Veterinary Toxicology." It is expected to publish these articles in book form at the conclusion of the series.

Part II.—SPECIAL TOXICOLOGY.

BY LIEUT.-COLONEL J. A. NUNN, F.R.C.V.S., F.R.S.E., C.I.E., D.S.O., BARRISTER-AT-LAW, DEPUTY DIRECTOR-GENERAL ARMY VETERINARY DEPARTMENT.

(*Continued from page* 216.)

Chemical Analysis.—The small white granules that are often found in the pharynx, stomach, and œsophagus should be first examined ; this can be done first by placing them in an ordinary test tube and

heating them over a flame. The arsenic will sublime and condense again on the cold portion of the tube, in a ring of shining crystals, found to be regular octahedrons, or portions of such, with facets that are equilateral triangles when examined with a pocket lens. Oxide of antimony, which much resembles arsenic, is not so volatile, condenses lower down the tube, and much more slowly in the form of needles. *2nd.* The arsenic is mixed up with black flux, which consists of charcoal and cyanide of potassium, and introduced into a very small test tube, or, better still, one of those specially made for the purpose, with a narrow neck and a bulb. It is heated to redness, the arsenious oxide giving off oxygen, and the metallic arsenic, being volatilised as a gas, with a smell of garlic, is again condensed in the form of a shining grey ring on the narrow part of the tube. This part of the tube is cut off with a fine file or glazier's diamond, and placed in an ordinary test tube, which is heated, when a white ring with the characteristic octahedral crystals will form on the upper part.

The viscera and their contents should next be proceeded with, and the first step is the destruction of the organic material. This can be accomplished either by Fresenius and Babo's method, which has already been described, or by Armand Gautier's, which is specially adapted for arsenic.

Armand Gautier's Method.—The material is divided into small pieces and placed in a new china capsule that has at least five or six times the capacity of the material placed in it; this is necessary on account of the bubbling over that takes place during the process. About 30 grammes of concentrated nitric acid is added for every 100 grammes of material, and gently heated until the mass is fluid, when the vessel must be removed from the flame or the contents will catch fire and be destroyed.

When cool about 10 grammes of pure concentrated sulphuric acid is added, and the mixture again heated till the white fumes of sulphuric acid are given off. It is again removed from the flame, and, drop by drop, with constant stirring, about 25 grammes of pure nitric acid added, and again heated till the contents turn into a friable mass of charcoal that can be powdered in the capsule. This charcoal is washed with boiling water acidulated with hydrochloric acid and filtered, the residue being again washed with boiling distilled water. The two fluids are mixed together and bisulphate of soda added until a strong smell of sulphuric acid is given off, and then boiled until all smell of sulphur disappears, the resulting fluid being of a clear yellow colour, which is tested for the suspected arsenic.

To a portion of this fluid a small quantity of bisulphate of soda is added, which reduces the arsenic into arsenious acid, rendering it more easily precipitated by sulphuretted hydrogen. In the toxicological laboratory of Paris the custom is to neutralise the liquid by a few drops of ammonia, and expose it for twelve hours to a

weak stream of sulphuretted hydrogen, obtained by the action of pure hydrochloric acid on pure sulphate of iron, the flask containing the liquid being placed in a water bath at about 50° Cent. When this part of the operation is concluded the liquid is decanted into a fresh flask, corked up, and let stand for twenty-four hours, when a yellow precipitate is formed by the sulphur being thrown down by the sulphuretted hydrogen. If there is arsenic present it is thrown down with the sulphur as sulphide of arsenic. The precipitate is allowed to stand, then filtered, and washed with distilled water.

If the case is one of poisoning by arsenic or antimony, either of them will be present in the form of a sulphide, and a ready way of separating them is to make use of the solvent property of ammonia for sulphide of arsenic, the sulphide of antimony remaining insoluble in it. The precipitate is treated several times with ammonia diluted with one part its volume of water, the resulting clear fluid being an ammoniacal solution of sulphide of arsenic. Sometimes the liquid is turbid, but this is immaterial. The ammonia is evaporated over a water bath, the sulphide of arsenic left as a residue, and submitted to Marsh's test.

Marsh's test was discovered in 1836, and based on the facts—*1st*, that arsenious acid is decomposed by hydrogen formed from the action of dilute, sulphuric, or hydrochloric acid on zinc, forming arsenurated hydrogen. *2nd*, arsenurated hydrogen is decomposed by heat, the hydrogen being given off, and the arsenic deposited in a black shining patch. The sulphide of arsenic is converted into arsenious acid, before being placed into Marsh's apparatus, by treating the residue of the ammoniacal solution left after evaporation with pure nitric acid, and evaporating it over a water bath to dryness, when it is again treated with both nitric and sulphuric acids; evaporated first over a water, and finally a sand-bath, till white fumes of sulphuric acid are given off. It is important that all excess of nitric acid should be driven off, as it impedes the reaction. To the residue is added water acidulated with sulphuric acid, which is placed in the Marsh apparatus.

This is so simple and well known that it is not necessary to enter into a description of it. The zinc and sulphuric acid are placed in the large vessel, but they must be absolutely pure, for it should be remembered that they both are liable to be contaminated with arsenic. The zinc can be purified by melting, and adding ½ to 1 per cent. chloride of magnesia; volatile chloride of zinc being formed, which removes with it the arsenic and antimony as chlorides.

The fact of zinc containing arsenic, and the great difficulty of obtaining it pure, has led to chemists seeking for some substitute. Seline proposed hydrochlorate of ammonia, and Tardieu magnesium, which is more easily obtained pure.[1] Sulphuric acid may contain sulphate of lead, nitric and hypo-nitrous, and sulphurous acids, and arsenic; it can be purified by Bussy and Buignet's

[1] Et Tardien etude medico legale et clinique l'empoisonnement, 1875.

method.[1] Commercial sulphuric acid is placed in a flask and heated over a sand-bath; 10 grammes of nitrate of potash per kilogramme is added, and brought to boiling-point; when the temperature is reduced by turning down the flame, and 10 grammes of sulphate of ammonia in powder is added, the mixture being allowed to cool. It is then placed in a still, and the first portion of the distillate, or about one-fifth of the total, is rejected, also the last fifth.

When pure sulphuric acid and zinc are brought in contact there is sometimes difficulty in getting a chemical reaction; and some chemists bring this about by the addition of a few drops of a solution of sulphate of copper. This is not, however, a practice to be recommended, as the copper enters into combination with a certain amount of the arsenic, and causes error in estimating the true quantity present; a few drops of platinum chloride is to be preferred. About 25 grammes of zinc to 50 cubic centimetres of sulphuric acid are required, but Dragendorff recommends a larger quantity. The chemical reaction, however, should not be violent, for if too much heat is generated sulphuretted hydrogen will be formed, which will decompose in the heated portion of the tube and form a layer of sulphur.

It is advisable to stand the flask in which the hydrogen is generated in cold water, and in order to prevent regurgitation into the tube it should only be two-thirds full.

Brouardel and Ogier recommend that the apparatus should be set working for at least half an hour before the material to be tested is placed in it, so as to be certain there is no extraneous arsenic in the materials; also to ascertain that it does not leak, by putting the finger on the orifice of the tube, when the acid will rise up in the straight one if air-tight. The jet of hydrogen is then lighted and a clean china plate or saucer held in front of it.

If there is no black patch formed it is certain that there is no arsenical contamination of the reagents, and the liquid to be analysed can be then introduced carefully into the apparatus. It may be desired only to ascertain if there is arsenic in the suspected material, or it may be necessary to ascertain the quantity of the poison there is in the material.

I. *Qualitative Analysis.—A. Formation of Patches.*—The hydrogen flame, which should not be more than ¾ inch long, is at first of a yellow colour from the presence of sodium in the glass, but this soon disappears, and it becomes pale, and at the same time slight white fumes appear from the oxidation of a small quantity of arsenic in contact with the atmosphere under the influence of heat.

If the flame is interrupted by a cold white body, the arsenic is deposited on it in characteristic black patches, but to obtain them satisfactorily certain precautions are necessary. The plate or saucer

[1] Bussy and Buignet, Purification de l'acide sulfurique arsenifere Journal de pharmacie et clinique. 3ᵉ serie, xliv. p. 177, et tome xlv. pp. 369 and 465. 1864.

must be held before the flame for just the right length of time, for if too long the deposit will be evaporated by the heat. For this process it is not necessary to heat the tube, as a ring of arsenic is not required.

B. Characteristics of the Patches.—1. The patches of arsenic are of a greyish black, with a metallic lustre in the centre, a white film of arsenious acid outside, and between the two a dark ring, which, when viewed by transmitted light, is brown towards the outer, but opaque towards the inner margin. Deposits of antimony have not this brown colour; they are less homogeneous, and in parts are white. Arsenic in burning also gives off the characteristic smell of garlic, which antimony does not.

2. The arsenical patch disappears quickly when warmed, the antimony one does so much slower, and before it volatilises fuses in places.

3. Bischoff's test may be used; a solution of hypochlorate of soda will rapidly and totally dissolve the arsenical stain, but the antimonial will not be effected.

4. If the arsenical stain is covered with an ammoniacal solution of sulphuretted hydrogen, and then carefully evaporated in the presence of a drop of hydrochloric acid it turns to a bright yellow colour—sulphide of arsenic, but it must not be confounded with sulphur, which is the result of a contamination. If the patch is composed of sulphide of arsenic it will completely disappear if treated with ammonia. If the antimonial patch is treated in the same fashion it turns an orange red.

5. The suspected patch is dissolved by a little nitric acid, and evaporated over a water bath, allowed to cool, and treated with a drop or two of ammonia, which is evaporated. It is then touched lightly with nitrate of silver, and if arsenic, turns brick red—"arsenate of silver," but if antimony, there is no reaction. If ammoniacal nitrate of silver is used, the treatment with ammonia may be dispensed with.

6. The fumes of iodine and bromine turn arsenical patches first yellow, then brown, and if heated they disappear. Antimony turns brown at once.

II. *Quantitative Analysis.*—MM. Brouardel and Ogier's method is that which is used in the Paris Laboratory. It is useless to light the gas that escapes from the apparatus. If the tube is heated the arsenic will be deposited on the cool portions, and if it is long enough there will be no loss. The process must be carried out slowly, and occupies from twelve to twenty-four hours. The portion of the tube on which the arsenic is deposited is cut off with a file, and weighed in a scale registering up to one-tenth of a milligramme. The arsenic deposit is removed by nitric acid, the tube washed with distilled water, dried, and again weighed, the difference representing the amount of arsenic deposited. The solution of nitric acid can be evaporated and the residue tested in the manner described with ammoniacal solution of nitrate of silver or sulphate

of copper. If several rings have formed, it may be found convenient to unite them by gentle heat, and allow the vapour to deposit on the cool part of the tube. All the reactions and tests can be carried out as mentioned in the same way, or with the patches on china plates.

Fatal consequences are recorded of sheep being poisoned after using an arsenical sheep dip. A well-known case, *Black* v. *Burton*, was tried at Newcastle Assizes in February 1859. Accidents also have taken place from sheep being turned out into pastures after dipping, and contaminating them.

Arsenic is used by the professional cattle poisoners of India, usually in the form of a suppository made up with flour and gum or honey, and thrust into the wall of the rectum with a sharp stick, that lacerates the bowel, the animal dying from enteritis and peritonitis. An inflamed wound is left in the rectum, "usually at the side," and arsenic can generally be detected in the surrounding tissues. This crime is very common in parts of the Punjab.

ANTIMONY.

The various compounds of antimony were at one time in high repute as medicines, but have of late years dropped out of fashion. Potassium and antimony tartarate, or tartar emetic, however, still holds its place, and sometimes what is known as the kermes mineral, or yellow antimony, a mixture of the oxide and sulphide, as well as sesquichloride (or butter) of antimony, the former as an alterative, the latter as a caustic, in canker and thrush in the horse, foot-rot in sheep, and foul of the foot in cattle. Algaroth powder (antimony oxychloride) and black antimony (antimony sulphide) have in some remote parts a reputation for improving the condition of animals, and as they would only be used by ignorant persons, it is possible that accidents might be caused by them. Some of the condition mixtures sold contain, amongst other ingredients, antimony sulphide, and are still used by carters, grooms, and other such persons.

The only form of antimony likely to cause poisoning is the tartar emetic, and, as far as can be ascertained, cases have all been accidental; no malicious one has yet been recorded in animals. Ruminants are exceedingly tolerant to it, and as it is a powerful emetic, animals capable of vomiting eject a considerable portion of the dose taken.

Antimony is almost always taken into the system by the mouth. It is sometimes used as an external application in cattle in cases of rheumatism and chest diseases, causing pustules to form, but it is likely to give rise to deep-seated inflammation and sloughing, with permanent blemishes.

Toxic Doses.—These have not been determined with any degree of certainty; they depend greatly on the rapidity and amount of absorption that takes place, also on individual tolerance.

Kaufman gives the poisonous dose as—

Horse,	. .	25 to 30 grammes.
Pig,	. . .	6 to 8 „
Dog,	. . .	0.2 to 0.5 „

Finlay Dun states that he has administered one in four drachms of tartar emetic in a bolus to the horse night and morning for several days without any result. Mr. Barlow gave a horse 10 oz. 6 drachms in six days before the animal died. Frohner found an ounce in a bolus was not fatal, but the same amount in solution caused death in eight days, and two ounces in two and a half hours.[1] Hertwig found that, given intravenously, one drachm caused great disturbance, and two drachms death in about three hours.

Cattle appear to be most tolerant to tartar emetic. Hertwig has given up to ten drachms without any effect, and Finlay Dun an ounce twice a day. Hertwig records doses of one and three drachms in solution and seven in a bolus being given to sheep. Gilbert states that four to six drachms in solution were fatal. In the pig Hertwig found that two drachms in solution caused death.

Dogs are less tolerant, but they have a safeguard in being able to vomit; if unable to do so, one grain has been fatal. Intravenously, Taylor states that three to six grains is fatal in eight to ten hours; Frohner half a grain in half an hour.

Legal News.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.

(Before the MASTER OF THE ROLLS, LORD JUSTICE ROMER, and LORD JUSTICE MATHEW.

BUXTON *v.* PROCTOR.

THIS was an appeal from the judgment of Mr. Justice Grantham at the trial of the action without a jury, reported in *The Times* of May 30. The action was brought by the plaintiff, a doctor practising at Fazeley and Tamworth, to restrain the defendant, who was formerly the plaintiff's assistant, from practising within 10 miles therefrom, in breach of an agreement between the parties.

By an agreement dated the 11th of August 1890, the plaintiff, who was practising as a doctor at Fazeley and Tamworth and the neighbourhood, agreed to employ the defendant, who was a qualified doctor, as an assistant in his practice or business of a surgeon, apothecary, and accoucheur, and to pay him a salary of 90 guineas for the first year, 100 guineas for the second year, and 110 guineas for the third year, and a like or such other sum as might be agreed upon for any following years of the employment, the plaintiff also finding the defendant suitable board and lodging; and in

[1] Jahrbuch de Arzneimitrellehre für Thierarzte, 1900.

consideration thereof the defendant agreed to serve the plaintiff as his assistant, and he further agreed that he would not "at any future time hereafter (without the express consent in writing of" the plaintiff, "his executors, administrators, or assigns) practise, use, or enter into the business or businesses of a physician, surgeon, apothecary, or accoucheur, or any or either of them, either on his own account or as assistant to any other person or persons, public body, or corporation, (other than" the plaintiff, "his executors, administrators, or assigns), or establish any dispensary or other place for the businesses aforesaid, or any or either of them, within the towns of Fazeley or Tamworth, or within a distance of 10 miles therefrom, on any pretence whatever." The agreement contained a clause that either of the parties might determine the agreement at any time by giving to the other of them one calendar month's notice in writing for that purpose. It appeared that the defendant first became assistant to the plaintiff in May 1890 before the above agreement was entered into, and that the defendant married a lady in the neighbourhood, and in February 1891 the agreement was determined, when the defendant left to practise elsewhere. He now returned to Tamworth and began to practise there, when the plaintiff brought this action to restrain him. Mr. Justice Grantham granted an injunction. The defendant appealed.

Mr. Lush, K.C. (Mr. Firminger with him), for the defendant, contended that the restrictive clause in the agreement was unnecessarily wide, as it was not reasonably necessary for the plaintiff's protection, and was therefore void. It was to last during the lifetime of the defendant, and the employment might only have lasted just over a month, as it might have been determined at any time by one month's notice. In fact, the defendant was only in the plaintiff's employment for a few months. Further, the area was too wide. Secondly, assuming that the restrictive clause was not void as being unreasonable, the Court in its discretion would not grant an injunction, but would leave the plaintiff to his remedy in damages. The defendant had only been a few months in the plaintiff's employment, and came back after more than twelve years. It was absurd to suppose that in these circumstances the defendant was likely to take away any of the plaintiff's patients in consequence of his previous connection with the plaintiff.

Mr. Dickens, K.C., who appeared with Mr. Adair Roche for the plaintiff, said that it was stated in the Court below that the defendant had frequently come back to the neighbourhood in the interval. It would be an extreme hardship on the defendant to grant an injunction, and there would be no corresponding advantage to the plaintiff. He referred to Haynes *v.* Doman (1899, 2 Ch. 13).

Mr. Dickens, K.C., and Mr. Adair Roche, for the plaintiff, were not called upon.

The Court dismissed the appeal.

The Master of the Rolls said that upon principle, and upon the authority of Haynes *v.* Doman, the appeal must fail. The agreement was entered into by a man of full age and was perfectly intelligible. By it the defendant undertook to serve the plaintiff, who was a doctor, upon certain terms, one of which was that he was debarred during his natural life from practising within a certain distance of two towns. In Haynes *v.* Doman it was held that a restriction to extend over a man's life was not on that account unreasonable. There could be no other ground for holding the restriction unreasonable, because the restriction was limited to a distance

of 10 miles from two towns. An injunction, which was the only mode of enforcing the agreement, should therefore be granted.

The LORDS JUSTICES agreed.

The case is an important one, and assistants and locums in signing the usual bond should take care that the covenant not to practise in the neighbourhood is only for a certain time.

The Times, March 18th, 1904.

Reviews.

THROUGH the courtesy of the Principal Veterinary Officer, J. A. Gilruth, Esq., M.R.C.V.S., we have received the report of the Division of Veterinary Science of the New Zealand Department of Agriculture for 1902-3, containing 336 pages and numerous illustrations.

Many important matters are touched upon, showing the vast field there is for the use of the skilled veterinarian in a new country, especially an essentially agricultural one. The resignation of so many members of Mr. Gilruth's staff is regrettable, but in the end we think it will do good. The public authorities have to be taught that a veterinary surgeon is not an ignorant clown, but an educated gentleman with brains in his head, who can succeed in other walks of life if his employers undervalue him; but the fact that certain of these gentlemen obtained higher remuneration from private employers than the Government should open the eyes of the New Zealand authorities, in the same way as those of the War Office were about the Army Veterinary Department, and show them that they are not the only employers in the world.

It appears a bill is to be introduced as to the use of unsound stallions —a most necessary measure if New Zealand is to maintain her reputation for the soundness of her horses, and it is proposed to relax the quarantine regulations for dogs imported from England, as rabies has been non-existent for such a long time.

There are interesting articles on hepatic cirrhosis in horses, said to be caused by eating ragwort (Senecio Jacobœa), and contagious mammitis in cows, which appears to have been imported from the Continent; also on swine fever, in grappling with which the New Zealand authorities have been more successful than the Board of Agriculture. Altogether the report is a credit to all concerned, and the illustrations are excellent.

OEBER DAS RAUSCHBRANDGIFT UND EIN ANTITOXISCHES SERUM MIT EINEM ANHANG. Die RAUSCHBRAND SCHUTZIMFONG, VON Dr. D. GRASSBENGER, und Dr. A. SCHATTENFROH. Published by Franz Deutsche, Leipzig and Vienna, 1904. Price 3 marks.

The authors, who have been studying symptomatic charbon for several years, give their researches into a new process of immunisation of cattle. They first isolated the specific toxin of the bacillus, and then obtained an antitoxic serum.

They first test each separately, afterwards in conjunction, on animals, and their method is to use a mixture in due proportion of the toxic solution and antitoxic serum.

The experimental portion of the work was carried out in the Vienna Veterinary School, the practical in the Tyrol and Lower Austria, and the results have proved the practical value of this new method.

HANDBOOK OF MEAT INSPECTION. By Dr. R. OSTERTAG, Berlin Veterinary School. One volume; 314 pages; 176 illustrations. Published by Richard Shœtz, Berlin. January 1904. Price 9 francs 50.

The first edition of Dr. Ostertag's book was published only a year ago, and the fact that it has already reached a seventh edition is sufficient guarantee for its success. The book is specially designed for laymen who act as meat inspectors in many parts of Germany, but is valuable for the professional man also.

This edition is somewhat larger than the first, but the author takes care that its bulk should not be excessive. Certain chapters have been rewritten to bring it up to date with recent legislation in Germany, but the original plan has been adhered to as much as possible. The illustrations are good and clear, and the printing in good type—an important point in a German book. Altogether Dr. Ostertag's work is in advance of anything we know on the subject.

ZOOTECHNIE DES BOVIDES. By PAUL DIGGLOTH. Introduction by D. P. Regnard, Director of the National Agricultural Institute. One vol.; 450 pages; 107 illustrations. 6 francs. Published by J. B. Ballière et Fils, 19 Rue Hautefeuille, Paris.

When it is stated that the cattle in France number fifteen millions, and are increasing, the importance of the industry must be acknowledged; and if the use of oxen for draught purposes is decreasing, the reverse is the case in the use of meat, milk, butter, and cheese.

Chapters are devoted to the rearing of calves, young stock, and the use of them for draught, the butcher, or milking.

The different breeds naturally occupy a large portion of the land, viz.:—I. The Low Countries, Durham, Friesland, Oldenburg, Schleswig, Danish, Flemish, and Ardenese. II. German and Normans. III. Alpine, Swiss, Wurtemburg, Tyrol, and Italian. IV. Irish, Breton, and Channel Islands. V. Aquitaine. VI. Russian, English, Scotch, Norwegian, and Asia Minor. VII. Vendeian. VIII. Auvergne. IX. Jura, Simmenthal, Charolaise, and Austrian. X. Iberian, Landes, Sicilian, Spanish, Portuguese, Algerian, and Tunisian. XI. Oriental.

The illustrations are excellent, most of them from photographs by M. Bodmer.

SYNOPSIS OF VETERINARY MATERIA MEDICA, THERAPEUTICS, AND TOXICOLOGY. By EDWIN L. QUITMAN, M.D.C., Professor of Materia Medica, Therapeutics, and Toxicology in the Chicago Veterinary College. Second edition. Revised and enlarged. Chicago: Alexander Eger, Publisher, 1904.

As indicated by the title, the volume which Mr. Eger has placed before the veterinary profession in an enlarged and much improved form does not essay to be a full text-book upon the complex subject synopsised, but

"it has been the aim of the author to make this work serviceable to both the student and the practitioner of veterinary medicine by omitting all unnecessary embellishments or padding, that the reader may quickly glean the essence of the knowledge of the subject or drug for which he may be seeking." It is, then, more of an elaboration of the notes used by Professor Quitman in his lectures at the Chicago Veterinary College, and, as is the case with most all such productions, is apt to reflect the individual opinion of the lecturer more than the consensus of general professional judgment. It could not be otherwise, for a class of students look to their teacher for guidance in their estimate of drugs, and he fulfils their wants by making deductions from his special opportunities through reading and experience, and thus his subject is treated of more from the individual standpoint than is the case with more pretentious text-books upon materia medica. No fault is found with Professor Quitman's conclusions; he has certainly brought into compact form a great amount of information upon the subject, and it is right up to the hour, for we observe the description of new drugs just placed before the profession. The book is splendidly printed and bound in half leather, and sells for 12s.

PROTOZOA (ZOOLOGICAL RECORD, Vol. xxxix., 1902). By H. M. WOODCOCK, B.Sc., Zoological Society of London, 3 Hanover Square, London, W. 2s.

WE have received a copy of the Record of Zoological Literature for 1902, article Protozoa. Within recent years the interest in the Protozoa has extended from the confines of the zoologist, who merely concerned himself with structure, to the pathologist and parasitologist, who now view them as possible disease-producing agents. The work is really an elaborated bibliography of papers relating to the protozoa which have appeared within the last year or so, and though it is primarily of interest to the zoologist, yet it refers to a large proportion of the papers dealing with malaria, trypanosomosis, and piroplasmosis. The utility of the work is therefore an extended one; there is certainly no other record of the literature of the subject at all comparable to it for completeness.

Communications, Books, Journals, &c., Received.

Agricultural Journal (Cape of Good Hope); Berliner Thierärztliche Wochenschrift; La Clinica Veterinaria (Milan); Deutsche Thierärztliche Wochenschrift; Tannoform in Veterinary Medicine (March); The Sanitary Journal; Scottish Medical and Surgical Journal; Veterinary Record; La Riforma Veterinaria; Le Mois Scientifique (Paris); L'Echo Vétérinaire (Liège); Annales de Médecine Vétérinaire (Brussels); Johns Hopkins Hospital Reports; Journal of Comparative Medicine and Veterinary Archives; Recueil de Médecine Vétérinaire; Gazette Médicale de Paris; Modern Medicine; Johns Hopkins Hospital Bulletin; Il Veterinario di Campagna (Moncalieri); Le Bulletin Vétérinaire (Orleans); Revista de Medicina Veterinaria (Bucarist); La Revista Veterinaria (Buenos Aires); Zeitschrift für Fleisch und Milchhygiene (Berlin); Buletinul Societatii de Sciinte diu Bucuresci-Romania; The Meat Trades Journal; The Dental Record.